



## A SCREEN ASKS VIEWERS TO ZOOM IN. A PRINT INVITES THEM TO STEP CLOSER.

PRINT YOUR LEGACY.



epson.com/printyourlegacy

## Exceptional Images Deserve an Exceptional Presentation



#### Display Your Images in Their Element

Choose our Wood Prints to lend a warm, natural feel to your images, MetalPrints infused on aluminum for a vibrant, luminescent, look, or Acrylic Prints for a vivid, high-impact display. All options provide exceptional durability and image stability, for a gallery-worthy presentation that will last a lifetime. Available in a wide range of sizes, perfect for anything from small displays to large installations.



Learn more at bayphoto.com/wall-displays





Stunning Prints

on Natural Wood, High Definition Metal, or Vivid Acrylic

Quality. Service. Innovation.
We're here for you!



## **PhotoPro**

JANUARY/FEBRUARY 2016 Vol. 14 No. 1 digitalphotopro.com

#### **Contents**



**Features** 

#### **PORTFOLIOS**

**38** RESOLVING THE UNIVERSE Adam Woodworth on photographing the unseen night sky, in his own words

By Adam Woodworth, as told to William Sawalich Photography By Adam Woodworth



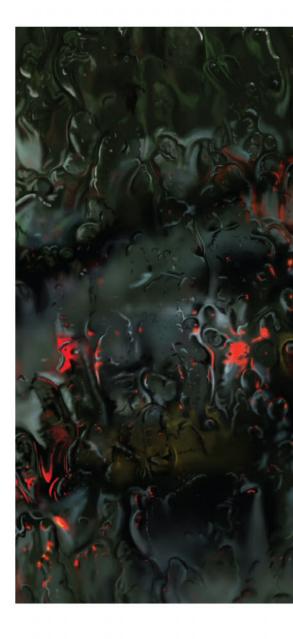
#### 46 NORTH KOREA IN 3D

Blending fine art and photojournalism, Slovenian photographer Matjaž Tančič presents a captivating three-dimensional view of the country By Mark Edward Harris Photography By Matjaž Tančič



#### **54** CHANGING THE WORLD ONE FRAME AT A TIME

Tamara Lackey has built her career by giving back to the photographic community, and now she's using photography to make a difference globally By Tracey Clark
Photography By Tamara Lackey



## **Editor's Note** Well, look at that. It's a new year, again. Another chance to stop, take a look at where we are professionally and personally, and see how we're doing. Each year, we can take stock of our lives, figure out where we want to go and set goals for the coming year.

For photographers—at least for the good ones—these *resolutions* are part of our regular routine. Most photographers evaluate themselves frame by frame. Could I have composed that shot differently? Was the exposure correct? Should I have used studio lights instead of available light? Part of being an artist is constantly to self-evaluate.

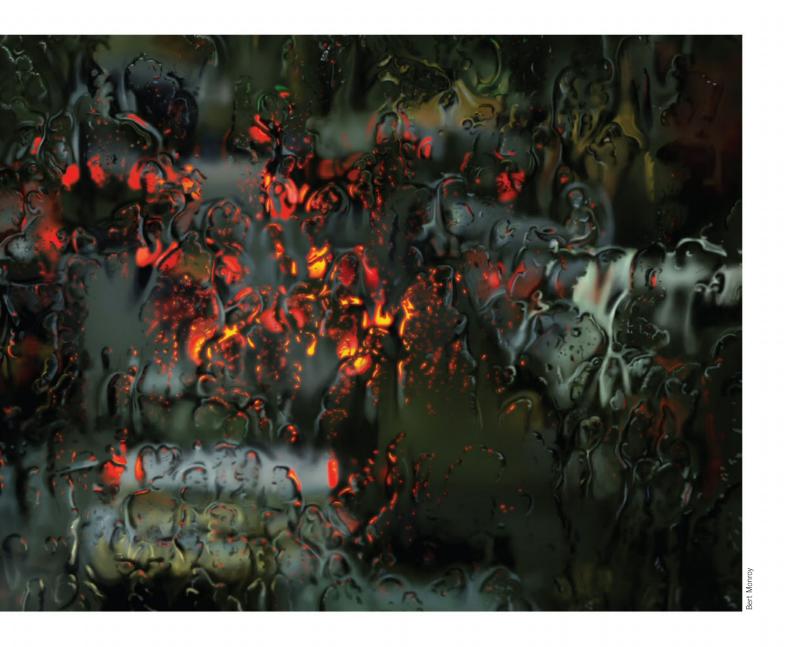
Still, it's good to step back and look at the larger picture, and to make some resolutions for the coming year (intentional puns, both). How is the health of your photographic career (if you have one)? Is it time to stop shooting part-time and become a full-time photographer? Is it time to do some *pro bono* work for a cause?

The theme of this issue is *resolution*, and we're approaching that both metaphorically and literally. Our profiles span the resolution gamut and include several radically different photographers, each with a different take on resolutions.

Tamara Lackey is a photographer, speaker, educator and author who shoots lifestyle portraits,

most notably, children. Her books on child portrait photography have been sold around the world, and she has been on countless TV shows and covered in magazines. More importantly, though, she has used her work to launch the not-for-profit Beautiful Together (beautifultogether. org), which works to improve the lives of orphans in the United States and Africa.

We also feature Slovenian photographer Matjaž Tančič, who recently had the opportunity to photograph inside the cloistered and militaristic Democratic People's Republic of Korea. Instead of simply capturing portraits, Tančič captured images in 3D—which brings the subject of his image into startling clarity. Even without 3D



glasses, his project has such granular clarity that it provides an intimate look at life behind a North Korean curtain few of us even get to peek at.

The astrophotography work of Adam Woodworth takes the concept of resolution about as literally as possible in photography. Woodworth, who has contributed to this magazine and our sister publications, is well renowned for his photographs of the heavens. With each shot capturing billions of light-years of stars and galaxies, there's little we know of that's higher resolution.

Veering just slightly away from photography, we look at the photorealistic work of Bert Monroy. An artist and illustrator, not a photographer,

Monroy is the preeminent photographic-quality painter, creating works of art with Photoshop and Illustrator that are indistinguishable from photographs.

Next, we delve super-literally into the word "resolution" by examining the current state of photographic technology. From sensors to lenses to printers to scanners, we look at how today's imaging technology is stacking up, and how the myriad small changes in performance in each of these areas combine to create images that are much higher resolution than ever before.

Since both Canon and Epson released new high-end (yet affordable) printers this year, we review them side by side, along with a look at today's best crop of papers from the leading manufacturers. There's a wide array of incredible paper and printers to make your output look sharp (I just can't resist puns like that).

What's *my* New Year's resolution? It's to continue to make *Digital Photo Pro* the very best photographic magazine available, in order to help each and every one of you find the inspiration, guidance, techniques, gear and resources needed to make 2016 your best, most successful and most creative year yet.

I also resolved to go to the gym more, but we'll see about that.

—David Schloss, Editor, @davidjschloss editors@digitalphotopro.com



JANUARY/FEBRUARY 2016 Vol. 14 No. 1 digitalphotopro.com

#### Contents

#### Equipment

32 THE RESOLUTION OF IMAGING

Today's cameras, lenses, printers and scanners are sharper, more detailed and better than ever, plus a guide to the best professional papers By David Schloss

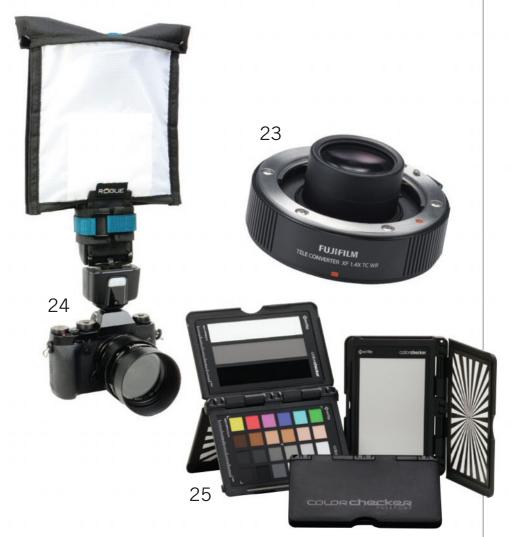
#### Technique

**62** THE ART OF SEEING DETAILS

Legendary illustrator Bert Monroy knows how to pay attention to the little things, a skill all photographers should develop By Mark Edward Harris Paintings By Bert Monroy







#### EDITORIAL

SUSAN FITZGERALD Publisher

WES PITTS Editorial Director

DAVID SCHLOSS

MAGGIE DEVCICH Managing Editor

J. ANA BECKETT Associate Editor

KRISTAN ASHWORTH

JOHN PAUL CAPONIGRO, ROBERT HAWK MICHAEL GUNCHEON, WILLIAM SAWALICH Contributing Editors

JEFF SCHEWE, DOUG SPERLING Professional Advisors

MICHAEL O'LEARY Art Director

LISA MALAGUTI Graphic Designer

#### DIGITALPHOTOPRO.COM HEIDI STRONG

VP, Digital Strategy

MICHAEL MA Technical Product Manager

MIKE DECKER Senior Digital Designer

LISETTE ROSE Digital Media Production Associate

STEVE SANGAPORE

Printed in the U.S.A.

\*\*Digital Photo Pro\*\* (ISSN: 1545-8520)—Vol. 14 No. 1—is published bimonthly except monthly in November and December by Madaven Media, LLC. Executive, editorial and advertising offices: 25 Braintree Hill Office Park, Suite 404, Braintree, MA 02184, (617) 706-9110. Periodicals Postage Paid at Boston, MA, and at additional mailing offices. Single-copy price—\$6.99. Annual subscription in U.S., Possessions, APOFPO—\$24.97. Canada—\$3.99.7; other foreign—\$39.97, including postage and taxes. Payable in U.S. funds. For orders, address changes and all other customer service, phone full-free (800) 814-2993. POSTMASTER: Send address changes to \*Digital Photo Pro. Box 37857, Boone, 16 S0037-0857. Canada Post Publications Mail Class Agreement No. 1559788.

Mail Class Agreement No. 1559788.

Email us (editorial matters only) at editors@digitalphotopro.com or visit our website at www.digitalphotopro.com Copyright © 2016 by Maddwor Media, LLC. No material may be reproduced without writen permission. This publication is purchased with the understanding that information presented is from many sources for which there can be no warranty or responsibility by the publisher as to accuracy, originality or completeness. It is sold with the understanding that the publisher is not engaged in rendering product endorsements or providing instruction as a substitute for appropriate training by qualified sources. EditORIAL SUBMISSION: Digital Photo Pro assumes no responsibility for solicited or unsolicited contributions and materials. Otherwise, insurance for such materials, in transit or in our possession, must be the responsibility of the writter or photographer. Digital Photo Pro does insurance of sour materials; in drains or mour possession; made the responsibility of the writer or photographer. **Biglial Photo Pro** does not be expected to agree to the conditions and stipulations printed on de-lorery memory, packing slips and related correspondence as they are presented without prior notice accompanying submission materials. Exceptions to this disclaimer of liability on the part of **Biglial Photo Pro** exceptions to this disclaimer or liability of the part of light Protor are must be prearraiged, executed in writing and signed by both par-ties prior to the shipment of materials in question, SUBSCRIBERS. Any obligation we now to you, including delivery of your magazine, is con-tingent upon you providing us with your correct malling address. If the Post Office notifies us that you with your displayed were all the Post Office notifies us that you magazine is undeliverable. further obligation to you unless we receive a corrected address from you within two years of the Post Office notification. BACK ISSUES are you within two years or the Post Omnice formication. Bakh NSUBS are available for one year prior to the current issue. To order within U.S., send \$9,00 plus \$4.00 postage and hand-ling (Canada: \$9.00 plus \$5.00; International: \$9.00 plus \$10.00) for each issue to Back Issue Dept., 25 Braintree Hill Office Park, Suite 404, Braintree, MA 02184, or go online and visit the eStore. No orders processed without proper funds and specific issue information.

Digital Photo Pro is a registered trademark of Madavor Media, LLC. Copyright © 2016 Madavor Media, LLC. All rights reserved. Reproduction in whole or in part without permission is prohibited.

To Subscribe Or For Subscription Questions: www.digitalphotopro.com or (800) 814-2993 or email DPOcustserv@cdsfulfillment.com











JANUARY/FEBRUARY 2016 Vol. 14 No. 1 digitalphotopro.com

#### **Contents**

#### **COLUMNS**

28 R/EVOLUTION

The Beauty Of Blending Modes By John Paul Caponigro

#### Departments

4 EDITOR'S NOTE 10 FIRST TAKES

22 DPP IN FOCUS

74 HI-TECH STUDIO: THE GOLDEN AGE OF PRINTING

**80** LOOKING FORWARD













ON THE COVER: By Matjaž Tančič



#### **ADVERTISING**

(617) 706-9110, Fax (617) 536-0102 BOB DORTCH VP, Creative Division

SCOTT LUKSH Media Sales Director

MICHAEL JORTNER Business Development Director

MICHAEL ECHEVARRIA Media Solutions Manager

CLAUDIA WARREN Media Sales Manager

JESSICA KROGMAN Sales Coordinator

#### MARKETING

CATHY PEARSON Marketing Analyst

BASAK PRINCE Marketing Specialist

CONSUMER MARKETING JIM MOOREHEAD Director, Consumer Marketing

JUSTIN PATRICK Circulation Marketing Manager

LIZ ENGEL Circulation Specialist



#### **BUSINESS/OPERATIONS**

Chairman & Chief Executive Officer JEFFREY C. WOLK

Chief Operating Officer SUSAN FITZGERALD

VP, Operations COURTNEY CARTER

VP, Digital Strategy HEIDI STRONG

Director, Integrated Production JUSTIN VUONO

Operations Manager LAURA FINAMORE

Licensing Manager J. ANA BECKETT

Controller PEGGY MAGUIRE

General Staff Accountant AMANDA GRUBBS

Staff Accountant TINA MCDERMOTT

HEIDIE HOGAN

Newsstand NATIONAL PUBLISHER SERVICES

#### CORPORATE HEADQUARTERS

Madavor Media, LLC 25 Braintree Hill Office Park | Suite 404 Braintree, MA | 02184

#### For reprint information, contact:

Advertising/Sales, (617) 706-9110

For digital editions:

zinio.com/digitalphotopro

For an extensive archive of back issues: www.digitalphotopro.com



#### Unlimited Creativity Found Here

Earn a Degree or Take Classes in San Francisco or Online

School of Photography // Advertising / Documentary / Fashion / Fine Art / Still Life Student Photograph by Kristina Varaksina, School of Photography

Academy of Art University | Founded in San Francisco 1929 | 888.680.8691 | academyart.edu | Yellow Ribbon Participan



to what I imagined was the general idea of water sprinkling, but give it a mysterious and dark turn. Besides the other aspects of photography I'm interested in, I'm also a self-portrait photographer. I wanted to pair my portraiture with something striking, mysterious and at the same time captivating and inviting, all the while representing the word. I set up my camera on a tripod with a plastic protective rain sleeve. I placed the tripod in my shower, below wasn't very warm, because warm water creates steam and fog that then clouds the lens. I took about 40 to 50 shots, and 15 to 18 of them were without fog or sprinkles on the lens. I selected my top ones, edited in Lightroom Hum on the G+ Community. In this hunt, we're usually competing with about 500 other photographers from around the world, each one with his or her own interpretation of a group of 10 words. For this word, I wanted to adhe the showerhead, and covered the walls of my shower with a black cotton backdrop and set up my SB-900 on a light stand, camera-left, at about 45° to 60°. That was a great way to create the shadows and light I was looking for. I turned on the shower, kept the shower curtains open and tried to get close enough to the camera where it could capture most of my expression, but not close enough for the sprinkling water to hit the lens. The water and changed the image to black-and-white to create more drama. This was my favorite one because of the detail in the sprinkles, the water streaks under my chin and the water droplets falling right over my eyes Follow Ricardo Williams on Instagram @ricardowilliams16, on Facebook at ricardowilliamsphotography and on Google+ at +RicardoWilliams.

Nikon D90, AF-S DX NIKKOR 18-105mm f/3.5-5.6G ED VR, Nikon SB-900 Speedlight, wireless remote trigger

First Place | Ricardo Williams | "Sprinkler"

Digital Photo Pro is pleased to announce the winners of the Black & White World 2015 Photo Contest. We received more than 3,000 submissions, with inspiring photography among the entries. Congratulations to the winners, and thank you to all who submitted. Visit digitalphotopro.com and go to the Contests tab to see the Finalists' Gallery and to learn about upcoming photo contests.

All rights reserved. Exposure and Alien Skin Software are registered Photo © 2016 Nels Akerlund. © 2016 Alien Skin Software, LLC. rademarks of Alien Skin Software, LLC.



## Exposure X

Come see how much simpler digital photography can be.

Over the past 10 years we helped photographers develop styles based on beautiful analog processes. Now Exposure X also handles the practical side of a professional workflow, including lightning fast photo organization. We completely eliminated frustrating concepts like catalog files. That lets you non-destructively edit RAW images without an import step and easily work on the same photos from multiple computers.

TRY EXPOSURE FOR FREE. ALIENSKIN.COM



"Exposure has always helped me explore new styles. Now I'm excited that it can help me be more efficient too."

- NELS AKERLUND





with
Father
ent in
er Joe
n't been
atts.
and

Second Place | Jack Foley | "Boston Joe"

I was hired by Father Bill's & MainSpring to do photography for their annual report. The organization provides services to people who are struggling with homelessness or who are at risk of homelessness to achieve self-sufficiency while maintaining their dignity and independence. Joe was a resident of Father Bill's & MainSpring adult emergency shelter in Brockton, Massachusetts. I'm using his first name only to protect his privacy. He was my first assignment in a full day of shooting. I had a brief introduction and was given five minutes to photograph Joe. My intent for the photo shoot was to show the character Joe had displayed in our brief meeting, and I was fortunate to capture his strength and confidence. I'm told Joe has since left MainSpring House and hasn't been seen lately. Three off-camera Nikon Speedlights were used to light the subject. Two lights were in back at 32 watt-seconds and a front light at 16 watts. The flashes in back were shooting through white umbrellas and the front flash was a beauty dish. I shot in RAW and processed the files in Lightroom and edited in Nik Silver Efex Pro. Some minor Photoshop work was done to the background to remove signs.

Visit Jack Foley's website at jackfoleyphotography.com, and follow him on Facebook at jackfoleyphotography.

Nikon D800, AF-S NIKKOR 24-70mm, 66mm at f/5, 1/100 sec., Nikon Speedlights



### Introducing Blackmagic URSA Mini, the lightweight Super 35 4.6K digital film camera with 15 stops of dynamic range!

Introducing URSA Mini, a handheld Super 35 digital film camera with an incredible 4.6K image sensor, global shutter and a massive 15 stops of dynamic range! The super compact and lightweight design is perfectly balanced, making it comfortable enough for all day shooting. URSA Mini lets you shoot at up to 60fps, features a 5" foldout viewfinder, dual RAW and ProRes recorders, and more!

#### Incredible 4.6K Sensor

URSA Mini can capture images at a resolution and dynamic range that goes well beyond that of traditional motion picture film so you can shoot your own epic, cinematic masterpiece! You can capture images up to 4608 x 2592, which is larger than 4K DCI, with 15 stops of dynamic range so you get incredibly clean pictures with amazing detail in everything from the darkest shadows to the brightest highlights! URSA Mini can record 4.6K at up to 60fps, or 1080 HD at up to 120fps.

#### **Lightweight and Portable**

URSA Mini's perfectly balanced body is made out of space aged magnesium alloys so it's rugged, yet lightweight and comfortable enough to be used all day. You get a super bright 5" fold out touch screen for on-set monitoring, that can also display overlays for timecode, histograms, audio meters, focus peaking and more! URSA Mini features full size, professional connectors, even 12G-SDI, so you don't need custom cables, plus high quality stereo microphones and a side grip mounted on a standard rosette.

#### www.blackmagicdesign.com

Electronic Viewfinder, lens and accessories sold separately.

#### **Completely Customizable**

Blackmagic URSA Mini is completely customizable so you can create a rig that's built specifically for your production! Add accessories like the Blackmagic URSA Viewfinder and Blackmagic URSA Mini Shoulder Kit, or choose from hundreds of third party accessories. URSA Mini has 9 standard ¼" threaded mounting points on the top and bottom of the camera so you can mount it directly to a tripod as well as add accessories such as rails, matte boxes and more.

#### **Non-Stop Recording**

You never have to stop recording because URSA Mini features two CFast 2.0 recorders! When one card is full, recording automatically continues onto the next. URSA Mini uses the latest, incredibly fast CFast 2.0 technology for recording speeds up to 350 MB/s. Wide dynamic range images are saved as 12-bit RAW files, which are perfect for high end grading and effects work, or as broadcast quality ProRes, for easy post production workflows with minimum storage requirements!



#### Blackmagic URSA Mini Models

Blackmagic URSA Mini 4K EF
Blackmagic URSA Mini 4K PL
Blackmagic URSA Mini 4.6K EF
Blackmagic URSA Mini 4.6K PL
Blackmagic URSA Mini 4.6K PL
S5,495
All models include DaVinci Resolve 12 Studio



from dark on the right to bright on the left. The shots that make up this panorama were taken at the start of astronomical twilight, which means that the sun was approaching the horizon (but still about 90 minutes away from sumrise) and close enough that its scattered light brightens the horizon. The glow starts around the area where the sun will rise, which is why the middle-left side of the image is brighter, and then on the far left it goes into A master of the art of nighttime astrophotography, Adam Woodworth is drawn to the landscape of his native Maine. Of his image "Panorama at Portland Head Lighthouse, Maine," he writes, "You'll notice that the photo goes shots as the sun was getting closer to the horizon. This panorama consists of about 10 vertical shots. Each shot was at ISO 3200 for 25 seconds at f/2.8 using my Nikon D800E and Nikon 14-24mm f/2.8 lens. The raw light pollution from the Portland area and gets very bright. Also, taking all the shots for the panorama took about 15 minutes, so within that time the earlier shots—I started from the right—would be darker than the later images were then prepped in Lightroom and stitched and edited in Photoshop." See more of Adam Woodworth's extraordinary nighttime photography in the portfolio feature in this issue.

#### SIGMA

#### PARAMOUNT.

The world's first\* F1.4 ultra wide-angle lens for full-frame DSLRs.

\*Among interchangeable lenses for 35mm full frame image sensors (SIGMA research as of October 2015)



#### 20mm F1.4 DG HSM

Case, Cover Lens Cap (LC907-01) included. USA 4-Year Service Protection



#### SIGMA USB Dock

Update, adjust & personalize. Customization never thought possible. Sold separately.

Learn more sigmaphoto.com/usb-dock







Based in Beijing, Slovenian photographer Matjaž Tančič recently turned his lens to cloistered North Korea and returned with a fascinating series of images, many of them in 3D. Fashion, photojournalism, portraiture, says, "I did more than 100 portraits of all kinds of people. My concept was to photograph the normal people, the people that are always overlooked because they're not the ones you encounter on every tourist tour or fit into propaganda or anti-propaganda, depending on your point of view. They're not marching soldiers showing how powerful and strong the country is, and they're not the hungriest political prisoners. I tried to capture these overlooked people as a study of present-day North Korean society. You can clearly see their fashion, their environment." See more of Matjaž Tančič's photography in the portfolio feature in this issue. advertising and fine art are all part of Tancië's visual approach to his North Korea photography, and he literally gives us a three-dimensional view of a country most see as one-dimensional. Of his intent, Tancië

Matjaž Tančič



"Hard to find a reason not to recommend it."

Digital Photo (UK) Dec 2015



professional portrait software now offers realistic makeup controls, wide angle (selfie) lens distortion correction, enhanced Child Mode, advanced skin coloring and tone correction, improved feature detection, and support for ultra-high resolution displays. You now have even more creative control and can show your subjects in their best light in seconds. Try it free now at www.PortraitPro.com.













Money-back guarantee if you are not satisfied.

Digital Photo Pro readers get an EXTRA 10% DISCOUNT

**OFF** any **SALE** or **LIST PRICE** -

use the code SE7907

at www.PortraitPro.com.



where she can use her photography to give back to the world. One project was to photograph the children in an Ethiopian orphanage and hang their portraits on the orphanage walls, using the portraits as a way to A Nikon Ambassador, Tamara Lackey found her calling in family and children's portraiture, but she also has channeled that energy and passion into the nonprofit she started, Beautiful Together (beautiful together org), tell as much as she could about each child and help the children get adopted. Of the experience, says Lackey, who's also an adoptive parent, "It was such a powerful way to share what photography can mean." You can see more of Tamara Lackey's inspiring photography in this issue of Digital Photo Pro.

## ADORAMA

YOUR USED PHOTO & VIDEO GEAR



#### ITS WORTH MORE THAN YOU EXPECT!

Whether consumer level, professional gear or even vintage cameras, your used equipment can easily be turned into cash or upgraded equipment.



Get a fast, free quote online at Adorama.com/used or in our Manhattan, NY store.

■ Scan Here to see how easy it is to sell and trade up!





## SIMPLY SOPHISTICATED



#### Future tech meets elegant retro design in the Olympus OM-D E-M5 Mark II

ou're uncompromising when it comes to your photography, but are you sacrificing portability for performance in your camera system? Some of the latest innovations in camera technology come from a surprisingly lightweight, compact system that will make you rethink your DSLR.

#### FORWARD-THINKING TECHNOLOGY

Take handheld photography, for example. The Olympus OM-D E-M5 Mark II features the world's most advanced 5-Axis Image Stabilization, which corrects not only horizontal and vertical camera movements, but also pitch, roll and yaw, providing an industryleading 5 steps of compensation for both still images and cinemaquality 1080 Full HD video capture.

This Micro Four Thirds interchangeable-lens camera features a 16MP Live MOS sensor and TruePic VII processor that together provide impressive speed capabilities like 10 frames-per-second burst shooting and an ultrafast maximum shutter of 1/8000 sec.

For studio work, where even larger image files are desired, an ingenious 40 Megapixel Capture Mode takes multiple images of the scene while slightly shifting the sensor between frames, then combines these into the final high-resolution image.

Another advantage for studio work is the E-M5 Mark II's tethered shooting capability. Connect the camera to your Macintosh or Windows computer, and Olympus Capture software—available as a free download-gives you total access to every camera setting and control.

#### A COMPLETE PHOTOGRAPHY SYSTEM

E-M5 Mark II, Olympus offers an extensive line of M.Zuiko precision lenses. Comprised of 21 lenses in all, the system includes five M.Zuiko PRO models, which together cover a 35mmequivalent focal range of 14mm to 600mm.

> For telephoto applications, the M.Zuiko Digital 1.4x Teleconverter MC-14 extends the reach of the M.Zuiko ED 40-150mm F2.8 PRO all the way to a 420mm equivalent. The MC-14 is also compatible with the new M.Zuiko ED 300mm F4.0 PRO for an extreme 35mm-equivalent telephoto perspective of 840mm.









#### OM-D ZUIKO

#### MIRRORLESS TRUTH: With 20 choices, there's an M.Zuiko lens for any shooting situation.

Lenses are critical to any photographer's creative arsenal. That's why the Olympus OM-D system offers a versatile and ever-expanding selection of Zuiko lenses, including the highly acclaimed PRO Series. Every Zuiko lens is meticulously engineered—crafted from precision-cut glass and painstakingly made to deliver extraordinary resolving power. So get as creative as you want and take on any shooting situation. We have a lens that gets the job done.

Get Power. Get Portable. Get Olympus.



## DPPInFocus

#### **New Tools Of The Trade**



#### << Lensbaby Composer Pro II With Edge 50 Optic

The latest member of **Lensbaby**'s optic swap system, the Composer Pro II is bundled with the Edge 50 Optic to produce beautiful photos with a selectable "slice of focus" in the midst of a defocused image. Composer Pro II has been updated with a sturdier metal body, which locks in the tilt and swivel lens position more securely. The manual-focus Edge 50 Optic-which can be swapped out for other lenses-offers a 50mm focal length with an aperture range of f/3.2to f/22. Available for a wide range of mounts, including Canon EF, Nikon F, Sony A and E, Pentax K, Fujifilm X, Micro 4/3 and Samsung NX. Price: \$425. Contact: Lensbaby, lensbaby.com.

#### Interfit S1 Monolight With HSS >>

Powered by a rechargeable battery for wire-free shooting or via AC power, the 500Ws Interfit \$1 Monolight with HSS delivers high-speed sync up to an amazing 1/8000 sec., as well as TTL for Canon and Nikon cameras. The 4500 mAh Li-ion battery provides up to 350 full-power flashes (400 in HSS mode) and can be controlled by an optional TTL remote. The S1 is bundled with battery and AC power options while a slightly smaller and less expensive version, the \$1a, is AC-powered only. Both include a flash head, 7-inch Bowens S-Type reflector and mini-USB cable. Given their capabilities, both models offer good value for the dollar. Price: \$1,000 (S1); \$600 (S1a); \$100 (remote for Canon or Nikon). Contact: Interfit Photographic, interfitphotographic.com.



#### Sigma 20mm F/1.4 DG HSM | A >>

Sigma has become the darling of third-party lenses the past few years, and one of their newest wide-angle pieces of glass, the 20mm f/1.4, is bound to join the list of photographer favorites. Designed for full-frame cameras, this fast prime is compatible with APS-C sensors, as well, and, at 20mm, is the widest in Sigma's Art Lens line. Available in Sigma, Nikon or Canon mounts, the lens is compatible with Sigma's USB dock for convenient updates and its Mount Conversion Service if you need a different mount. Price: \$899. Contact: Sigma, sigmaphoto.com.



## FUJIFILM TELE CONVERTER XF 1.4X TC WR

#### << Fujinon Teleconverter XF1.4X TC WR

Looking toward the future, **Fujifilm** has released the **Fujinon XF1.4X TC WR teleconverter** that currently works with the Fujinon XF50-140mm f/2.8 R LM OIS WR lens and will be compatible with select lenses going forward, including the Fujinon XF100-400mm (currently on Fujifilm's XF lens road map). For now, though, you can turn your XF50-140mm lens into a 70-200mm equivalent telephoto. You'll lose a stop with the teleconverter, but since the XF50-140mm is relatively fast at f/2.8, it's a minor trade-off given the extra focal length. And, like the lens, the teleconverter is water-resistant, too, so you're good to go regardless of the weather. Price: \$450. **Contact:** Fujifilm, fujifilmusa.com.

#### PocketWizard Plus IV Transceiver >>

PocketWizard's new Plus IV Transceiver retains all the benefits of its Plus III predecessor, but adds a few new features, including a TTL pass-through hot-shoe mount. For one, as a transmitter, the top shoe provides on-camera TTL compatibility with most Canon, Nikon and Panasonic cameras and flashes. The company hopes that, upon further testing, the Plus IV also will be compatible with at least some Fujifilm and Olympus cameras. Use the Plus IV as a receiver, and you have control over a speedlight mounted on the shoe when it's set to a manual power level. PocketWizard views the Plus IV as the perfect complement to the Plus III rather than a replacement. Either way, you'll get good use out of both models. Price: TBD. Contact: PocketWizard, pocketwizard.com.



## DPPInFocus

#### **New Tools Of The Trade**

#### Lomography Petzval 85 Art Lens >>

Take a step back into the 19th century with Lomography's Petzval 85 Art Lens. Based on a traditional design from the mid-1800s, the Petzval is manual focus only and produces a sharply focused area that fades into softer focus with a vignette. Optional aperture plates are available for crafting your own special look using the 85mm f/2.2 lens on Nikon F or Canon EF cameras. It works as well on 35mm analog cameras as it does on digital, and is compatible with both cropped and full-frame sensors.

Price: \$599 (lens); \$25 (aperture plates). Contact: Lomography, lomography.com.





#### << Expolmaging Rogue FlashBender 2 Mirrorless Softbox Kit

Designed for smaller speedlights that are used with mirrorless cameras, Expolmaging redesigned its Rogue FlashBender 2 shapeable light modifier to fit compact flashes with a head circumference between 6.25 and 7.25 inches, like the Nikon SB-500. And, Expolmaging has improved the belt-and-buckle attachment strap for a more secure fit. Create a softbox on the fly, shape a snoot or reflect/bounce light with this highly portable, affordable accessory. Price: \$50. Contact: Expolmaging, expoimaging.com; rogueflash.com.



#### << Epson Legacy Paper

**Epson** pulled out all the stops for the new **Legacy Paper line**, working closely with artists, European papermakers, galleries and chemical engineers to develop papers for photographers who want to exhibit and sell their prints. This collaboration produced a series of four papers with an emphasis on excellent black density, color fidelity and archival properties. Legacy Platine, Legacy Fibre, Legacy Baryta and Legacy Etching papers are available in cut sheets and rolls. Price: TBD. **Contact**: Epson, epson.com.

#### Think Tank Photo Lily Deanne Camera Bags >>

Designed by senior designer Lily Fisher and Pulitzer Prize-winning photographer (and company co-founder) Deanne Fitzmaurice, the **Lily Deanne series of camera shoulder bags** from **Think Tank Photo** were designed by women for women. But these shoulder bags—available in three sizes—don't use a pretty-in-pink approach. Photographers have a choice of Licorice or Chestnut colors, with a highly visible turquoise interior to make it easy to locate accessories. The bags are smart-looking, well made and highly functional, with plenty of room for camera gear, tablets or laptops. Price: Lucido (\$200); Mezzo (\$250); Tutto (\$300). **Contact:** Think Tank Photo, thinktankphoto.com.



# Arrite Colorchecker Colorchecker Colorchecker Colorchecker Colorchecker Colorchecker Colorchecker

#### << X-Rite ColorChecker For Video

Achieving critical color balance and exposure settings for video just got easier with X-Rite's ColorChecker Video and ColorChecker Passport Video. Both the 8.5x11-inch, double-sided ColorChecker Video and the smaller, more portable ColorChecker Passport Video feature multiple, vectorscope-friendly chromatic color patches, a white balance target, skin tone patches and a linear grayscale series for dynamic range. While only the larger model offers illumination check chips and desaturated color patches, the Passport version, which offers four video production targets (including one for focusing), folds neatly into a small case, so you may want to keep both in your gear kit. Price: ColorChecker Video (\$129); ColorChecker Passport Video (\$149). Contact: X-Rite Photo, xritephoto.com.

## **DPPInFocus**

#### **New Tools Of The Trade**



#### Perfectly Clear LUCID Apps

Like the **Perfectly Clear** plug-ins, the new **LUCiD** Desktop and iOS apps make short work of image editing. The cross-platform Desktop app is equipped with quick-fix, one-touch presets, as well as sliders for manual adjustments. A simple interface opens to eight presets (Details, Vivid, Beautify, Beautify+, Fix Dark, Fix Noise, Fix Tint, Landscapes). Click on the adjustments tab for a dozen manual slider options. When you find a combination you like, you can copy and paste settings to your images for a quick and easy workflow. Check out the iOS app to bring LUCiD to your iPhone or iPad. Price: \$49 (Mac and Windows); \$3 (iOS). Contact: Perfectly Clear (Athentech), hellolucid.com, athentech.com.

#### Corel ParticleShop Plugin >>

Based on Corel Painter's brush technology, the new cross-platform ParticleShop plug-in is equipped with assorted effects brushes to add fiery flare or stormy weather to your images. With 11 brushes in the \$50 starter pack, you can extend a swirl of fabric or a sweep of hair, create a dystopian atmosphere with Dust & Debris brushes or add a bit of sparkle if you'd like. To extend your creativity, additional brush packs are available for \$30 each. The plug-in is compatible with Corel Photo-Paint and PaintShop Pro, as well as Adobe Photoshop (starting with CS6), Lightroom and Photoshop Elements. Price: \$50; additional brush packs (\$30 each). Contact: Corel, painterartist.com, corel.com.



#### << ON1 Photo 10

ON1 has revamped and renamed its Perfect Photo Suite software. Now called ON1 Photo 10. the new user interface is only one of the improvements you'll notice, along with speedier performance, lighter memory requirements and a streamlined workflow. All the same components are there, including Effects, which has absorbed the Perfect B&W module, Enhance and Portrait. Seemingly small improvements like auto advance, easy access to sub-folders when browsing and mobile integration, to name a few new features, combine to make Photo 10 standalone and plug-in software a notable update. Price: \$120 (full); \$100 (upgrade). Contact: ON1, on1.com.

#### Macphun Aurora HDR >>

Software developer Macphun and HDR guru/photographer Trey Ratcliff teamed up to create Aurora HDR, a new Mac-only application that's fully equipped to handle all your high-dynamic-range needs. From edgy presets to more subtle extensions of shadow and highlight detail, Aurora HDR offers a wide range of controls and options, including layers. Available in Standard and Pro versions, both operate as standalone apps and, if you choose, plug-ins for Adobe Photoshop, Lightroom, Elements and Aperture. Designed to work on bracketed or single images, the software also works well with Macphun's other photo applications such as Intensify and Noiseless. Price: Standard (\$50); Pro: (\$100). Contact: Macphun, macphun.com.



#### PortraitPro Version 15

Efficient and intuitive, PortraitPro is a high-powered portrait retouching software equipped with enough virtual sculpting and makeup tools to rival a plastic surgeon and MUA in one easy-to-use package. Updated with a full complement of controls, **Version15** lets you realistically apply or enhance your subject's makeup and adjust skin tones. The Child Mode has been enhanced, there's a new wide-angle lens-correction option for selfies, and the software supports Apple Retina and high-res PC displays. This full-featured application excels at portrait retouching—with manual controls or presets—but also provides basic image adjustments, as well. The Standard version is standalone only; Studio and Studio Max work as standalone apps or plug-ins. Upgrade pricing is available. Price: Standard (\$80); Studio (\$120); Studio Max (\$240). Contact: PortraitPro (Anthropics), portraitprofessional.com.



#### **Panasonic**



















**PAUSE** THE MOMENT **PRINT** BIG PHOTOS

Available at panasonic.com and



1.35.5.6/14-140 ASPH. 058





See our entire 4K Hybrid Camera lineup at Shop. Panasonic.com/LUMIX-G7



## R/Evolution

## The Beauty Of Blending Modes

Use this Photoshop technique to target a specific color component without affecting the others

By John Paul Caponigro



 $\label{lem:contrast} \textbf{Contrast is increased, using Curves; saturation rises.}$ 



Hue is shifted, using Curves; luminosity rises or falls.

#### When you adjust color in digital images, several common—and often unintended—byproducts arise.

Increase or decrease contrast, and saturation will rise or fall. Increase or decrease saturation, and lightness will change. Make a hue adjustment with Curves (or Levels) by targeting specific channels, and an image either will lighten or darken. Make a hue adjustment with Hue/Saturation, and both saturation and luminosity are likely to shift, sometimes lightening and other times darkening. Correct one problem, and you may create another. Sometimes these byproducts are desirable; usually, they're not. While these changes may be minor, sometimes insignificant, when making subtle adjustments, they can become major when making more dramatic adjustments.

Is there a cure? There are several!

You can make additional adjustments to correct the byproducts of one adjustment. For instance, to compensate for value shifts when making color adjustments by targeting individual channels with Levels or Curves, many return to the Master channel to correct the accompanying shifts in value. To correct saturation shifts when contrast has been increased or decreased, a second adjustment is often made with Hue/Saturation.

Most of these secondary adjustments are performed to stabilize one color component while shifting another.

Color can be broken down into three essential elements: *hue* (a spectrum around the color wheel from red through yellow, green, blue, cyan, magenta and back to red); *saturation* (a gradient from intense to dull); and *luminosity* (a gradient from dark to light). Problematic color artifacts show up in one of these areas when adjusting others. That's because the most com-



Hue is shifted, using Curves; luminosity rises or falls.



With the blending mode set to Hue, luminosity remains stable.

mon color modes (RGB and CMYK) have the hue, saturation and luminosity interconnected, so it's necessary to make changes to more than one channel at a time.

In LAB mode, luminosity has its own separate channel and you can make adjustments to it alone, but saturation and hue are still wrapped into two channels, A and B. The color spaces that treat all three elements separately, HSB, HSL and HSV, aren't supported by Photoshop (or Lightroom).

Some adjustment tools allow you to make adjustments to one component of color without affecting the others, and you should use these tools whenever it's practical. You can check the Preserve Luminosity box when using Color Balance to set the brightness when making adjustments to hue. This works well when adjustments are made to the

midtones, but when targeting highlights and/or shadows, brightness or contrast may shift. Tools like these build the solution for the problem directly into their interface, but these tools aren't always the ones we need to accomplish a given task, nor are they the most precise.

Some tools even produce problems that aren't curable. For example, increasing or decreasing value using the Lightness slider with Hue/ Saturation will reduce an image's dynamic range, making white or black gray while darkening or lightening. The best policy is to avoid using these tools altogether. You can do more and do it with greater precision using other tools. (In this specific case, use Curves.)

#### **Blending Modes to the Rescue**

Wouldn't it be nice if you could target one specific component of color with-



out affecting the others with any color adjustment tool? With a blending technique in Photoshop, you can. You can use the blending mode of adjustment layers to constrain the effects of an adjustment to one or more components of a color. If you're making an adjustment directly to an image without using adjustment layers, you can Fade (Edit > Fade) the problem away immediately after applying the adjustment.

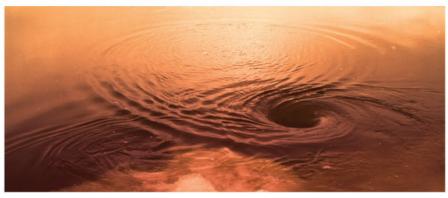
Unfortunately, you can't do this during RAW conversion with either Lightroom or ACR. Many of these side effects are built into the behavior of the sliders and no additional blend mode feature exists.

You'll find all of the blend modes in Photoshop's Layers palette. All layers, including adjustment layers, have a blending mode. A layer can only have one blending mode, but a layer's blending mode may be changed at anytime. The default is Normal, but there are many other modes to choose from. The long list of options you'll find under the blending mode pull-down menu, offering 17 choices in all, may seem overwhelming at first and deter you from using them altogether. While some experimenta-

tion with all of the blending modes may prove fruitful, start with the four that are most useful for color adjustment, the four that target specific components of color: Hue, Saturation, Color and Luminosity.

You can use the adjustment layer blending modes of Hue, Saturation, Color and Luminosity to target single color components, regardless of which space you're editing in. The blending mode of an adjustment layer constrains the effects of an adjustment to the component of color specified in its title.

Hue allows an adjustment layer to affect only hue, eliminating shifts in luminosity. Saturation allows an adjustment layer to affect only satu-



Hue is shifted, using Hue/Saturation; saturation rises and luminosity rises or falls.



With the blending mode set to Hue, luminosity and saturation remain stable.

ration, eliminating shifts in luminosity, and you can use this for most saturation adjustments, for instance, when you use Hue/Saturation.

Color allows an adjustment layer to affect both hue and saturation, eliminating shifts in luminosity. Use this

ON THE WEB>>

John Paul Caponigro's

in-depth instructionals

on image-processing

are available as an

and printing techniques

extensive archive online at digitalphotopro.com/

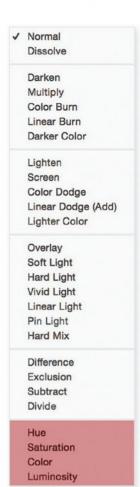
technique/revolution.

for most hue adjustments, for instance, when you use a single channel in Curves.

Luminosity allows an adjustment layer to affect only value or brightness, eliminating shifts in saturation. Use this for most contrast adjustments, for

instance, when you use the master channel in Curves. This functions just like adjusting the L channel in LAB without having to make a color mode conversion, possibly forcing you to flatten a file.

You can specify the blending mode of an adjustment layer when you first create it. Or, you can change the blending mode of an adjustment layer after its creation. Either way, it's more than likely that you'll want to



The precision and degree of control over color you can acquire today is nothing short of astonishing. It's responsible for producing a dramatic revolution in color photography. We now have near-total control of color's three primary elements—hue, saturation and luminosity.



Saturation is shifted, using Hue/Saturation; luminosity rises or falls.

compare the effects of both the alternate blending mode and the Normal blending mode. Sometimes, you may find you like the side effects and don't want to remove them. In these cases, leave the blend mode on its default Normal. As a general rule, I recommend you use the blend mode that targets only the element of color you're adjusting.

You can't reduce a blending mode by a percentage; it's an all-or-nothing proposition. If, for instance, you want to remove most, but not all, of the additional saturation introduced by a shift in contrast, you'll need to choose either blending mode Normal or Luminosity, and then make an additional Hue/Saturation adjustment. Pick the mode that gets you closest to the result you desire and then fine-tune the final effect with a subsequent adjustment.

The precision and degree of control over color you can acquire today is nothing short of astonishing. It's responsible for producing a dramatic revolution in color photography. We now have near-total control of color's three primary elements—hue, saturation and luminosity.

Add to this nonlinear color adjustment (even color transformation) the



With the blending mode set to Saturation, luminosity remains stable.

ability to affect specific hues without affecting others. Add to this the ability to make adjustments to specific ranges within each of those components, for instance, the saturation of highlights and/or shadows, rather than the component in its entirety. And there are many other possibilities. You can do virtually anything. You need only imagine the possibili-

ties and then find the right tool for the job.

John Paul Caponigro, author of Adobe Photoshop Master Class and the video series R/Evolution, is an internationally renowned fine artist, an authority on digital printing, and a respected lecturer and workshop leader. Visit johnpaulcaponigro.com.

# RESOLUTION

Today's cameras, lenses, printers and scanners are sharper,



Nikon D810

hotographic purists often will remind digital photographers that even the most modest piece of 35mm film can outperform digital photography when it comes to resolution. Film, they argue, has as much detail as somewhere between a 100-megapixel and 200-megapixel sensor, depending on how exactly you convert the resolving power of film's chemical process into what the digital camera does. While that's

true on its face, with every generation of digital photography, the technology

gets better, the components get more closely integrated, and the resulting images gain better and better resolution. That's thanks to the current state of today's sensors, lenses, printers and scanners, all of which have benefited from nearly 20 years of development since the digital era truly began.

Getting the most from today's gear requires an understanding of the different technologies involved in the imaging workflow and how to use them together to create images with unsurpassed resolution and clarity.

## OF IMAGING

more detailed and better than ever By David Schloss

#### Inside the Box: The Development of the Digital Sensor

At the core of digital imaging lies the sensor inside a digital camera. Look inside your camera body, and you'll see a reflective piece of silicon that doesn't appear any different than the electronic wafer that appeared in the very first digital cameras.

Look at the sensor under a microscope (and maybe with a degree in electrical engineering), and you'll see that the heart of the camera is vastly different than when digital photography began.

For starters, the sensor is a CMOS (complementary metal-oxide semi-conductor), where the first sensors were CCD (charge-coupled device). Aside from the different spellings of the arcane acronyms, the technology is much different.

CCDs, which came first, provided high-quality and low-noise images, albeit with a high manufacturing cost and a specialized production line. CMOS sensors can be made on the same manufacturing lines as other computer chips, which means the cost of development is lower—and that has helped keep the prices of digital cameras relatively stable. CMOS sensors also consume less power,

which is good for the battery life of today's camera gear.

When CMOS sensors first arrived, they were largely relegated to lower-end cameras like point-and-shoots and compact systems. It took a long time for the technology not only to catch up with CCD, but surpass CCD in terms of image quality.

The CMOS sensors in today's cameras are incredibly capable, allowing systems like the Nikon D810, the Canon EOS 5DS/5DS R and the Sony a7R II to create breathtaking images at a very high resolution.

The Nikon D810 has a resolution of 36 megapixels, the Canon EOS 5DS/5DS R has a 50-megapixel sensor, and the Sony a7R II has a 42-megapixel one that's backside-illuminated.

New technologies have further improved the performance of CMOS sensors. The Backside-Illuminated (BSI) sensors utilized in Sony's a7R II camera represent a big leap forward in CMOS design, although the technology actually has been available for digital cameras since Sony released the Exmor R sensor in 2009.

Normally, a digital imaging sensor is produced with the electrical wiring needed to transmit the data from each pixel on the sensor located on the front of the sensor, mostly out of ease of manufacturing. But that wiring, even though it's very, very small, still blocks some available light that might otherwise hit the photo receptors.

BSI design moves the wiring to the back of the sensor, allowing more light



to hit the surface, which makes BSI sensors much more capable in low light than their standard CMOS relatives. This helps counteract the physical problem that as resolution on a sensor increases, the sensitivity decreases.

This sounds complex, but it's just basic physics. The width of a pixel determines how sensitive it is to light. Bigger pixels are more sensitive because there's more surface area in the pixel for photons of light to hit; smaller pixels are less sensitive because there's a more narrow opening for light to enter the pixel, so fewer hit the surface of the pixel.

A good analogy is thinking of buckets in a rainstorm used to measure how much rain has fallen. Place one bucket in your yard, and you only know how much rain fell in one spot. Place a bunch of buckets in your yard, and the resolution of your measurements increases you'll know how much rain fell by your back door, your driveway, your yard and so on. A narrow bucket won't catch any raindrops that aren't falling straight down, so you miss recording some rainfall when the wind is blowing. A wider bucket is more likely to catch the individual drops of rain, even if the wind is blowing, so its measurements are more sensitive.

Since a 35mm sensor is always the same size, to increase the resolution (the number of buckets), you have to make the buckets smaller, which reduces their sensitivity. That means that all things being equal, the 50-megapixel Canon EOS 5DS is much less sensitive than the 22-megapixel sensor in the Canon EOS 5D Mark III, but the 5DS has much higher resolution.

The pixels of BSI sensors aren't any larger, so they're not inherently more capable at gathering light, but since they remove the wiring on the front that blocks part of the opening of the pixels, more light hits the sensors. The effect is like taking off a pair of sunglasses when it gets dark out—your eyes aren't any more sensitive, but there isn't something blocking the light in front of them.

So far, Sony has been the only manufacturer to pull off volume production of high-end BSI CMOS sensors, but it's only a matter of time before the BSI process becomes the standard in digital imaging.

This leap gives digital sensors some pretty incredible sensitivity in low light—often three or more stops of less noise than non-BSI sensors. A camera with a BSI sensor can easily capture low-noise images at ISOs where film used to really fall apart.

At the same time that sensors have improved, their onboard processors have improved, as well. The Nikon D810, for example, eliminated the low-pass filter found on the D800, which increased image sharpness. A low-pass filter is a screen that sits before a sensor and slightly blurs the incoming light to prevent a moiré pattern—strange artifacts that occur when many lines are close to each other. Moiré is often seen when photographing fabrics and architecture, and it's difficult to remove in software.

While a low-pass filter eliminates moiré, it does so by softening the image. The Nikon D810 and other cameras with no low-pass filter produce relatively moiré-free images. How is it possible to remove a filter and not experience the negative consequences? Largely it comes down to the processors that take the data from the sensor and create images from it. More powerful processors can eliminate moiré in-camera without the filter. The result is a much sharper image with very few artifacts, another huge boon for photographers.

There are also areas where lens design and camera design overlap to create better images, albeit not thanks to the resolving power of glass or sensors. The same advances in technology that have increased the ability of cameras to process out artifacts like moiré have also been responsible for a huge improvement in autofocus speed and accuracy.



If a camera can lock onto an image more accurately, the result is a higherquality image. Autofocus systems are increasingly accurate, and where cameras a generation or two ago could lock onto a moving target with accuracy, many systems can perform not only face detection, but eye detection. Several cameras we've reviewed recently have had the ability to pick out the eye closest to the camera and prioritize focus on that eye. There's an incredible amount of processing needed to do that, and the systems we've seen are much more capable of focusing on a face or an eye than camera systems without this technology.

For a photographer working in a fast-capture situation, the ability to lock onto a face or an eyeball without effort means a higher percentage of in-focus (and therefore useful) images. While the resolution hasn't increased in this case, the ability to capture acceptable photos has increased exponentially. An in-focus picture has more resolution than one that's out of focus.

#### Lenses

While film has tremendous resolving power, the lenses from the film era weren't always able to provide an image of high enough quality to take advantage of that.

Lens production technology has advanced significantly since the advent of digital photography. New optical coatings, new construction methods, blazingly fast autofocus motors and better production methods have resulted in lenses that are tack-sharp with incredibly high resolution.

Lenses in the digital era have also been designed to meet the demands of the digital sensors in cameras. The chemical coating on the surface of a piece of film was receptive to light coming in at all angles, but a digital imaging sensor only likes light that strikes the sensor directly. Lenses that were designed in the film era produce images of lower resolution than a lens designed for digital (all other things being equal).

This was one of the big rationales behind the Four Thirds standard and the new lens designs and mounts—lenses for digital sensors needed to be designed to optimize the light coming in. Digital cameras have been around long enough that the stable of lenses produced by the manufacturers has been revised with more modern design.

Combine the newer lens designs with new coatings and improved optical elements, and even some entry-level lenses are able to produce images with professional quality.

#### **Printers**

While printers seem to have become second-class citizens in the photographic world, they're actually incredibly important tools in the digital era. (See "Hi-Tech Studio" in this issue for an overview of today's state-of-the-art printers and the incredible output they produce.) Whether printing is done for prepress proofing, gallery exhibitions or simply to better evaluate a photograph, creating consistent and accurate artwork is incredibly important. The need for printers to lay down consistent ink with a variety of papers is a huge challenge, and it becomes even more challenging when trying to maintain consistent output across multiple printers.

Canon and Epson are the dominant players in the studio printer market, though in the wide-format world there





The improvements in digital imaging allow for better images, in a wider variety of situations. The image of balloons (top) was captured in incredibly low light with a Canon EOS 5DS, while the interior of a military plane (above) was captured with a connected camera. Both look better than anything available at the dawn of digital photography.

are several other—possibly less well-known—manufacturers. While on the outside printers look like they haven't changed, inside the technology has seen some pretty major improvements.

Print heads have improved, with more nozzles per inch, anti-clog technologies and the ability (in some printers) to sense when a nozzle is clogged and instantly replace it with a neighboring nozzle. This is a huge improvement, as it allows a printer, which otherwise would have gaps in coverage, to lay down ink across the entire page. Traditionally, clogged nozzles would require a heavyduty cleaning cycle, but with automatically reconfiguring nozzles, it's possible to keep printing without having missing ink or without having to stop to purge the printer.

Today's printers are much more capable at laying down ink droplets in exactly the right spot, and the right placement of ink determines the actual resolution of a printer. (Put a few droplets that are supposed to be an eyelash in the wrong place, and you have a blurry eyelash, for example.)

That's why the overall resolution of a printer (the 2400x1200 dpi number) isn't the sole measure of the image's quality. If you lay down 2400 drops in *exactly the right place*, the effective resolution of the printer is much higher than if you lay down 2400 drops just slightly in the wrong place.

There are a few systems that are used to lay down ink with scientific precision. The stepper motor moves the print heads along the paper, and a more precise stepper motor means more precise drops of ink deposited on the paper, and the motors (and related parts) inside a printer are much more accurate today than they have ever been.

There's also the head and the nozzle themselves, and they're much more capable of laying down drops of ink in the right spots. Some printers, such as the Epson P600 and P800, even use variable droplet systems that lay down different-sized drops of ink depending on the coverage needs of an area.

But it's not just improvements in hardware that have improved the resolution of printers; inks and papers have evolved, as well. The ink that's dispensed by a printer isn't the same as the ink that runs out of a ballpoint pen. Each drop of ink is encapsulated with a

coating that makes sure the ink ends up in the right spot, and only in the right spot. The coating makes sure the drop doesn't spread to neighboring fibers of paper, and a "gloss optimizer" coating makes sure the ink fills in properly and reflects light correctly on a variety of different substrates.

Papers, too, have improved. Microscopic coatings on papers keep the ink in place, and even rag papers from the major paper mills now are coated with a surface that provides both texture and a safe place for ink to land and to stay in place. Ink is also now more vibrant and more durable, requiring less ink used to create an image and better theoretical longevity.

Finally, the print engines—the internal processors that take a photograph and break it down into patterns of dots necessary to produce an image—have improved. Printers are better able to render images into output, eliminating wasted ink, bleeding colors, and improving edge detail and sharpness.

The result of the combined enhancements in printer technology is output that's vastly better than even a few years ago, even though the resolutions of the printers that are listed on the outside of the boxes still have the same 2400x1200 specifications of a few years ago.

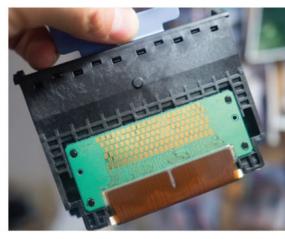
#### **Scanners**

It might be true that fewer scanners are used these days than when the film-to-digital transition began, but their role in the photographic chain is no less important. Moving images from the analog world to the digital world requires a combination of several of

the technologies already covered, optics and internal mechanics.

A scanner is a combination of the stepper motor of a printer and the lenses of a camera, with a dash of internal processor thrown in. As technologies have improved across the printer and optics spaces, scanners have improved,

Plustek OpticFilm 8100 35mm Film Scanner



The print heads in today's photographic printers are incredible technological marvels, packed not just with nozzles to spray the ink, but sensors, electronics and de-clogging technology to keep it flowing consistently.

as well. The sensors and lenses inside a scanner are more accurate and able to process data more quickly, and the motors and mechanics that control their operation are improved, too.

The result is that scanners today can reproduce a piece of film with greater fidelity and a wider range of shades than previous generations could, at a more affordable price. For shooters with a collection of film, the scanners on the market today will produce a better, sharper and more coloraccurate image than devices of just a few years ago.

#### **New Resolutions**

Of course, these technologies will all improve over time. The sensors, lenses, processors, motors and print heads a few years from now will exceed the capabilities of today's equipment. That's both the joy and the headache of digital technology.

Film equipment evolved on a linear scale while digital technology tends to improve on a logarithmic scale. The result is that, every few years, the equipment, as a whole, gets sharper, more accurate and more affordable, improving the industry as a whole. IPP

You can follow David Schloss on Twitter and Instagram @davidjschloss.



# MAKE YOUR SUBJECTS GLOV

AVAILABLE ONLY AT ADORAMA





### ParaPop, HexaPop & QuadraPop

Portable softboxes that set up with a **POP** 

- Unique design creates the easiest softbox to use
- Silver reflective grid lining
- Heatproof
- UV filtered diffusion material
- Aluminum alloy frame rods
- Optional Speedrings available for the following: Alien Bees, White Lightning, Bowens, Flashpoint, Elinchrom, StreakLight & Quantum

See the light with Glow at Adorama.com/go/glow







# Resolving The Universe ADAM WOODWORTH ON PHOTOGRAPHING THE UNSEEN NIGHT SKY, IN HIS OWN WORDS

By Adam Woodworth, as told to William Sawalich >> Photography By Adam Woodworth



he night sky definitely evokes a lot of mystery and awe. As humans, we were originally evolving way back when there was no light at all, only firelight. You could just hang out and look up at the stars. Maybe that's how our ancestors spent their evenings. And, nowadays, I think the fact that we don't get to see it could be a huge part of its appeal. Even people I meet who live in very dark areas, they're still excited about seeing it. I've met a lot of people who live in those areas and have never seen the Northern Lights or the Milky Way, because they live in a brightly lit house. The average person, even in really dark areas, isn't as familiar with the night sky as we would have been 100 years ago.

The first time I remember seeing it in such amazing clarity was up at the end of the Maine coast. Once you get above Acadia National Park, the population really thins out. I remember seeing for the first time, with my naked eye, the Milky Way reflected in the ocean. I could see the light from the galactic center of the Milky Way causing a reflection that was just a bright spot on the water's surface.

The image I call "Galactic Cave" was taken at a place in Acadia National Park that's no longer on the official maps. They took down the signs and railings in order to protect the area and to protect people. But there's nothing off-limits in Acadia; it's a well-known spot just because it's such a cool view.

#### **Preproduction**

In order to get in and out of this [area] safely, you've got to know how to navigate wet rocks, and you've also got to go down at low tide and come out before the tide comes up too high. Otherwise, you're either swimming out of the cave or you're just stuck. I imagine the cave fills up with water to the point that there's nowhere to stand. You'd be in trouble if you were there.

I'd had this plan for two years or so. I was hoping to get this photo, and I just never got it until last winter, the dead of winter. A bunch of things needed to come together. You have to have clear skies, obviously, and no moon. The tide needs to be the right level so you can get in and out, and it needs to be the right level during the time when the Milky Way will be visible when looking out of the cave. So there's a lot of timing and planning that go into it to make sure everything lines up right. You look at tide charts, and once inside, from experience of being in the cave I know if it's mid-tide or close to low tide, if I'm still safe or not.

As for the stars, there are smartphone apps you can use to pinpoint from any spot where the galactic center of the



Milky Way will be. Those help you as far as they can, but only if you know the angle where you'll be standing exactly.

There's an app called PhotoPills I like. They give you a 2D satellite view, basically a Google Earth map, and you can move around anywhere and pick a spot where you want to stand. It will then show you the angle of where the galactic center of the Milky Way will be, and which way it will be arcing through the sky. Before these apps, it was looking at star charts.

You can also use Augmented Reality, where you hold the phone up and it shows you an overlay of the sky and how it will look at a certain time of night. If you stand there in the middle of the day, you can get a good idea of where things will line up.

But, for this, looking at the satellite map with the app, it was



unclear which exact point was the cave entrance. I knew roughly where it was, but it's not labeled on the map and you can't tell it's a cave because you're looking at it from above. So I took the information from PhotoPills that told me on this night what the angle would be of the Milky Way, how far south it would be, and I took a regular old compass and went down to the spot during the day and checked the angles from inside the cave. That way, I could figure out if it would line up, and how it would line up, as much as I could in advance. And then when you're doing that, you have to remember to take into account magnetic declination because the information the maps give you is on true north, but the compass is magnetic north, and if you don't remember to do this calculation, you're going to overshoot or undershoot.

#### WEST QUODDY HEAD LIGHT

This is actually just one shot. It's not straight out of the camera, but it's as close as any of my shots is to straight out of the camera. If you're standing there and looking up at the light, you'll see that wagon-wheel effect with your naked eye; it's just not as pronounced in terms of seeing that many stars behind it. And in some other photos, you'll see in my slider or on the website, you'll see that it looks like the beams are going everywhere, you'll see light like that, and if there's enough moisture in the air, you'll see the beams with your naked eye, but the camera really catches them much better due to the long exposure. A lot of people wonder how it's possible to take a photo that's so bright and still be able to see the stars behind it. The answer is that, like a lot of these lighthouses, it's a blinking lighthouse and it only blinks on every five or six seconds. So, in a long exposure of 25 seconds....



#### The Night of the Shoot

We were lucky, I guess, because we had an enormous amount of snow, and it was incredibly cold for long periods, and places on the coast would get encased in snow like this. That doesn't happen every year. It was around 0°, and I had hand warmers. I went to scout it out during the day, and I had to break trail down through the woods to the top of the shore, and you're basically walking above the cave and all the rocks, on top of the cliffs. And then you slide down this little ice chute and walk across the rocks to get in. I did that during the day so that I knew how to get there and back, and then I had to come back at night and do it all in the dark. I had snowshoes on initially to get down through all the deep snow to the top of the cave, and then I took the snowshoes off and put microspikes on and slid down, and then with the microspikes on so I didn't slip on all the slippery rocks, I walked across to the opening of the cave and went in.

Safety is a concern, but I don't think about it as much as maybe I should because I grew up on the coast and I'm used to wandering around on wet rocks all the time. I've actually fallen down in this cave, the first time I went to shoot the sunrise. But I was with a friend, and I was just scratched up. I only broke a trekking pole. So it's not a place to screw around with, but at the same time, I just do it. It's what I do.

All these things had to come together and they did come together, other than the slight clouds there. They were clearing out. It's totally what happens on the seacoast of Maine: The forecast tells you it's totally fine, and then you get there and there's a wall of clouds they didn't predict.

#### **Postproduction**

I worked a lot to get the ice to come out. This is obviously a multiple exposure blended together. None of my photos are just straight out of the camera; there's always some editing.



VIKING LIGHTS
"Viking Lights" has a replica
Viking ship, a little Viking
boat in the foreground, with
the Northern Lights above it.
It's from Newfoundland. This
shot was taken in Norstead,
which is a replica of a Viking
village and port of trade.
L'Anse aux Meadows is the
only confirmed Viking site in
North America.



MILKY WAY OVER SCREW AUGER FALLS

Certainly, in the dark, you're not going to see much looking into a gorge on a moonless night. If you stand there long enough and let your eyes adjust, you'll see detail, but you're not really going to see any color in the leaves unless you shine a flashlight on them. I did this image a few years ago and my processing methods have changed a little bit. The fact that the sky has a lot of blue and pinkish-magenta warm color at the bottom might be a little different than I would do now. And the rocks are a little too magenta. A lot of it is just processing choices, aesthetic choices.



Just like with any digital photography, the raw file is a starting point. Almost all of my night shots are composites of multiple images. Here, I worked hard to balance the light. By the time I was doing some of the foreground exposures, it was twilight so there was a lot more light hitting the ice than earlier in the night. If you don't really know what you're looking at, it probably looks fine, but to me, I can tell there are some highlights on the ice that wouldn't be there in pitch-black night. It's a mix of things. And I was lucky that all of those icicles were there. It made it kind of cool.

When I'm out giving a talk on this stuff, I often say it's science fiction at this point: You're shooting something you can't even see. That said, I try to make the photos have somewhat naturally accurate colors to them. Sometimes the scientifically correct white balance looks really strange. I try to be as natural there as much as I can.

#### **GLOWING COAST**

That has bioluminescence in the water, the water is glowing blue. It was published on Space.com and got a lot of press. While the glow in the photo is brighter and much more blue than it was in person due to the limitations of human vision, and the fact that the camera can see more with long exposures, it was still intense to see in person, and the photo doesn't do the experience justice. My night vision was adapted enough to see the bright glow in the water as the waves washed over rocks, exciting the microorganisms in the water.

NIGHT AT ST. MATTHEW'S CHAPEL, #2 Sugar Hill, New Hampshire. Sometimes clouds ruin night shooting, but sometimes they really add drama. These thin passing clouds really made the mood for this shot of the Milky Way over a field of lupines at peak bloom with St. Matthew's Chapel in the background.

#### Adam Woodworth's Landscape Astrophotography Gear

Nikon D810A

**NIKKOR** 14-24mm *f*/2.8

Gitzo GT2542L tripod

**Acratech** GP ballhead—inverted for panoramas to use its built-in leveling base and pano head

Acratech Nodal Rail slide for panoramas

**Promote** intervalometer

Pixel intervalometer—backup unit

Giottos Rocket Blaster air blower

F-Stop Satori EXP backpack with Large ICU

**Dew Not** DN004 Heater Strip electronic lens heater—fits the NIKKOR 14-24mm, prevents dew on the lens—plus battery and adapter cable

**Chemical hand warmer packets** to heat the lens and your hands

**Velcro**® to attach the intervalometer and heater battery to the tripod legs

**PhotoPills**—iPhone app for planning Milky Way shots, as well as daytime/moon shots

solarham.net, softservenews.com,

**spaceweather.com**—websites for current aurora information

Google Earth—for scouting

Good, old-fashioned magnetic compass—for scouting Milky Way angles at locations that can't be scouted in Google Earth, in addition to using Augmented Reality in PhotoPills

**CrowdMag**—iPhone app for calculating the magnetic declination to correct compass readings to true north

Starry Landscape Stacker—Mac-only app for star-stacking images with landscape foregrounds

Adobe Lightroom and Photoshop

Getting the sky white-balanced right is very tricky. There's a big difference between what the real sky color probably should look like and what looks pleasing. I err on the side of pleasing. I used to err on the side of blue—just always a blue sky. That's usually completely wrong. Sometimes a blue sky is totally correct because if you're shooting in astronomical twilight, the sun hasn't set far enough beyond the horizon to make it dark yet. So even though the sky may look black to your eyes, it may still be blue in the camera.

But when it's pitch-black out and the sun is way on the other side of the earth, there's just not a lot of blue in the sky. There's some, but there's a lot more air glow, and the stars themselves are what's kind of lighting up the landscape, if you think about it. Here you can see some orange on the horizon from light pollution.

It all comes down to this: I want to make it look natural, but I also want it to look like what I felt, like what the emotions made me feel while I was there. I have some photos that look over the top, in terms of processing, and they match the emotion I felt, but they don't look anything like it was supposed to look.

I'm not a photojournalist; I'm an artist. My goal is to make images that I find pretty, compelling and interesting, and if it means that I'm pushing the colors a little bit here and there, then whatever. That's just the way it is. DPP

To see more of Adam Woodworth's photography, visit his website at adamwoodworth.com.



#### A Closer Look At Adam Woodworth's Landscape Astrophotography Technique

WHEN ADAM WOODWORTH WAS USING A NIKON D800E. he limited his maximum ISO to 3200; but with his Nikon D810A, he'll go up to ISO 12,800, as needed.

"The simplest way to do it is to shoot the widest lens you have at the widest aperture," says Woodworth. "I tend to leave the shutter speed long, but if you can boost the ISO that much, you'll capture more stars and get a cleaner image with a better exposure. The more light you can let in, the more dim stars you'll capture."

Woodworth uses his widest lensthe "gold-standard ultrawide" Nikon 14-24mm zoom. He has found, after much experimentation with the "500 rule" (which states that you take the 35mm equivalent of your focal length and divide it into 500 to determine the maximum shutter speed for minimizing

star trails), that he prefers a maximum exposure of 25 seconds. He says of the rule, "It's a good place to start, but it's a little too lenient."

Woodworth also uses a technique called "star stacking," whereby he'll shoot 10 exposures of the night sky in quick succession at, say, 10 seconds each. Then he uses Starry Landscape Stacker software to combine these multiple sky exposures into a single, tack-sharp, noise-free image of the nighttime sky. This image will be composited with one or more frames making up the brightly illuminated foreground landscape.

"A lot of people will do a single shot at 25 or 30 seconds," he says, "and just rely on the shadow slider in Lightroom to brighten the dark spots. But if that's all you're doing, you're going to end up with the foreground being noisy and out of

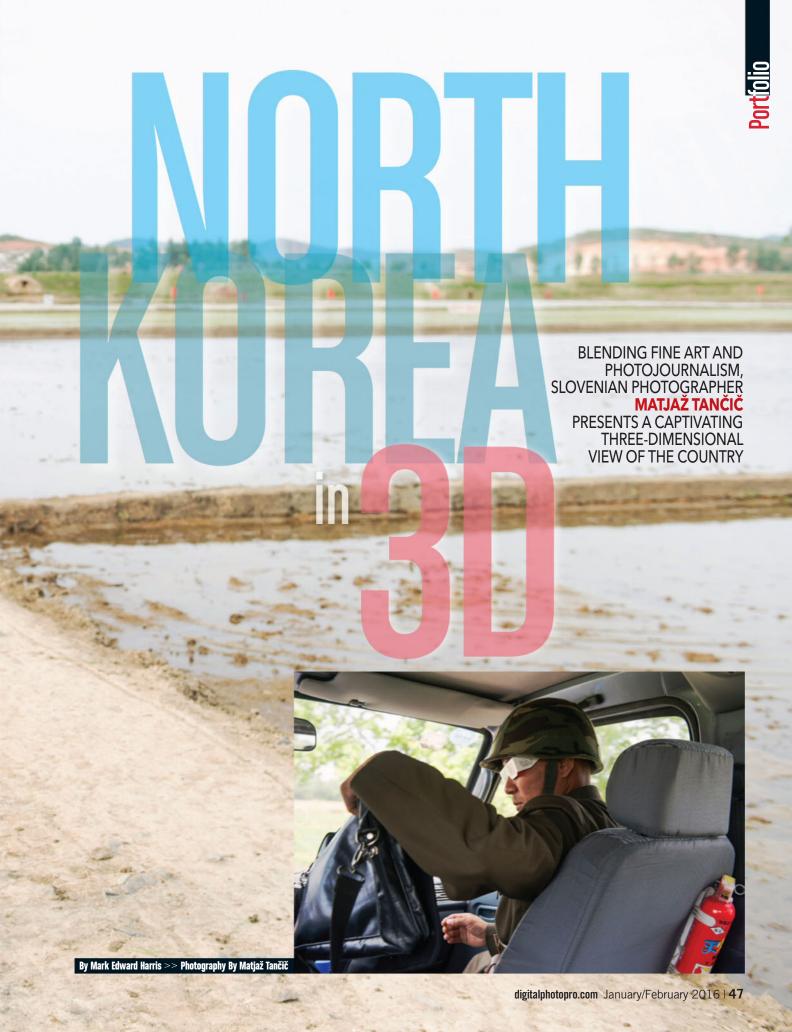
focus, because I'm going to focus for the stars in the star shots, and then pull it in for the landscape."

Then it's just a matter of blending, compositing the sky with the foreground. The sky is usually much brighter than the nighttime landscape in a remote area, so Woodworth usually uses multiple foreground exposures.

"You can take them usually at lower ISOs," he says, "with longer shutter speeds, and you might have to change focus a few times and do focus stacking. You could stop down to f/5.6, f/8 or f/11, and do one really long foreground shot and have everything in focus, and blend that, but you're talking possibly hours for a single exposure. And if you bump the tripod, you're screwed."

"So, yeah," adds Woodworth, "they take a lot of work."







eijing-based Matjaž Tančič's work knows no borders. The Slovenian photographer not only has ventured inside the cloistered, secretive North Korea, but gives us a glimpse inside the military state in 3D. It's a particularly fascinating way to look at a country that's viewed one dimensionally by the outside world. Tančič's body of work also isn't constrained by the usual bounds of photographic categorization. Fashion, photojournalism, portraiture, advertising and fine-art projects are all part of Tančič's visual realm, and they all play a part in his North Korea project.

**DPP:** How did you come up with the idea for the North Korea project?

Matjaž Tančič: I was visiting my friend Vicky Mohieddeen, who's a filmmaker and works in Beijing for Koryo Tours. They specialize in bringing people to North Korea. I was showing her some photos, and Nick Bonner, the owner of the company, walked in. She said, "Nick, you have to see Matjaž's 3D photos." So he put on the pair of 3D glasses I had with me and

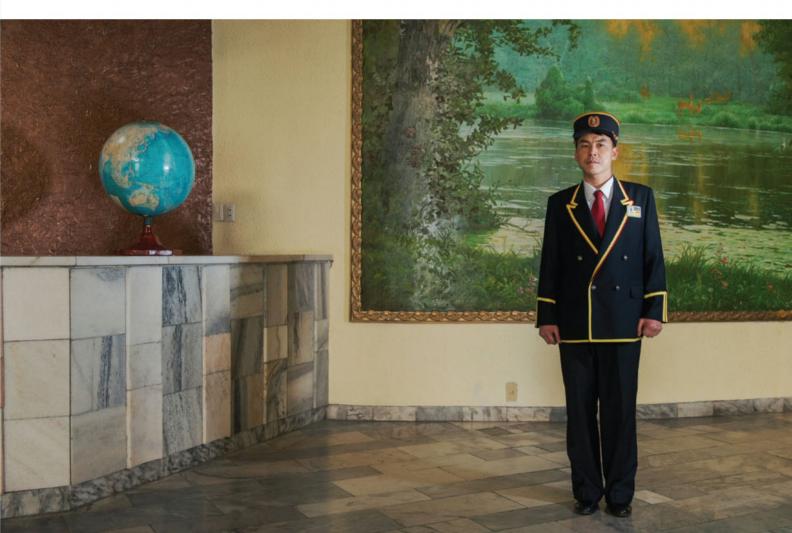
took a look and was blown away. "Hey, we should do something in North Korea together! Are you interested?" I responded, "Hell, yeah!" But from this idea to realization took about eight months of negotiation. First, they went to Pyongyang and suggested the idea. Then another time they took some of my photos there. I remember seeing a photo of one North Korean in a uniform sitting at a round dinner table, and he's wearing my 3D glasses and looking at my photos. Then there were the negotiations about the locations, about the concept, about everything. It took a long time, but in the end we managed to do it.

**DPP:** How long were you in the country once you got the green light?

**Tančič:** We were there for 10 days on a private tour. It was just me, with Vicky, who was the producer and filming behind the scenes, and two guides and a driver. Since we were such a small team, we managed to be really productive and visit a lot of places all over the country in our van. I did more than 100 portraits of all kinds of people. My concept was to photograph the



MATJAZ TANČIČ HAS BEEN working with 3D imagery for some time, and a meeting with a filmmaker friend in Beijing was the genesis for his North Korea project. Shooting more than 100 portraits all over the country in 10 days, with two guides and a driver, the result is a fascinating view of a country that's seen as onedimensional by the outside world. Tančič's body of work here blends elements of fine art, photojournalism, portraiture and fashion.





normal people, the people that are always overlooked because they're not the ones you encounter on every tourist tour or fit into propaganda or anti-propaganda, depending on your point of view. They're not marching soldiers showing how powerful and strong the country is, and they're not the hungriest political prisoners. I tried to capture these overlooked people as a study of present-day North Korean society. You can clearly see their fashion, their environment.

**DPP:** How are you able to create the images from a technical point of view?

Tančič: The theory behind 3D photography is really simple. You just need two photos, left and right, one for each eye. In theory, the distance between two cameras is about 6.3 millimeters because that's the average distance between human eyes. But, in practice, it's way harder. For every shot, you have to calculate the distance between cameras depending on how close you are to the first object in the photo, how far is the farthest object and what focal-length lens you're using. You have to shoot with identical cameras, lenses and settings at the same time. I shot with the Nikon D810 and Coolpix A cameras that were triggered with custom-made wired and radio-control triggers. They were mounted on one tripod on a custom-made type of slider. I

then used StereoPhoto Maker, a free, but powerful program made in Germany to put the images together in post. Another thing to keep in mind is if the viewer is going to be looking at images with the blue/red glasses, then you should avoid scenes with lots of blues or reds. Those colors don't look particularly pleasant through 3D glasses. But I've been doing 3D for such a long time that I don't have to struggle to figure out the alignment every time I set up a shot to get successful results.

**DPP:** So you can focus your efforts and energies on the subject.

**Tančič:** The subject is the most important aspect. I think this is the biggest problem with 3D. Too often people are more interested in producing images or movies where everything is flying in your face. They want 3D to be spectacular, but they forget about the subject and why they're using 3D and what it can add to the photo itself so it's not just a gimmick.

**DPP:** How did you light your subjects?

**Tančič:** Sometimes with an Elinchrom Quadra light with an Octabox, and other times with a Nikon SB-900 with a beauty dish.

**DPP:** What were some of the highlights and the frustrations of your time in North Korea?

**Tančič:** It was like time travel. When you land in North Korea, it's like you just emerged from









TO CREATE HIS 3D IMAGES, Tančič shot with Nikon D810 and Coolpix A cameras that were triggered with custom-made wired and radio-control units, mounted on a tripod. He used an Elinchrom Quadra light with an Octabox and a Nikon SB-900 with a beauty dish. You can see one of his 3D images on the opposite page. Of shooting in 3D, Tančič says, "The subject is the most important aspect. I think this is the biggest problem with 3D. Too often people are more interested in producing images or movies where everything is flying in your face. They want 3D to be spectacular, but they forget about the subject and why they're using 3D and what it can add to the photo itself so it's not just a gimmick."



a time capsule. Everything is as it was in the 1950s or '60s. The only reminder that you're in the present are cell phones, and when you're walking in your '60s-style hotel room, there's a plasma TV on the wall. Those are the only intruders into the present. For me, it wasn't so shocking, because when I grew up in Yugoslavia, nowadays Slovenia, we had a similar system. We had one great leader, Tito. It wasn't as extreme, but we had propaganda and military parades. There were images in North Korea that reminded me of what I had seen in my youth, especially the concrete architecture and big stadiums. Among the many highlights were visiting areas that have only recently been opened for tourism or places where people don't usually go such as the Chollima Steelworks in Nampo, the second-largest steel company in the country.

The frustrations were that there are lots of amazing images that you see, but you don't bother even asking if you can shoot because you know the answer is going to be no. For instance, we were driving in the van in the countryside and all of a sudden there were 50 or 100 soldiers running next to the road in full army gear and wearing gas masks. It was a completely surreal scene that I would have loved to have photographed, but I didn't even reach for my camera because I knew that there was no way that I was going to be allowed to photograph it. My guides were great. Mr. Kan was assisting me with my lights. Miss Kim was always talking with people and standing in for me while I was testing lights and camera positions. They were hard-working and great people, and I definitely couldn't have done the project without them. So when they asked me not to photograph soldiers or construction sites, I had to respect the rules. It was the only way to work as a team so successfully.



**DPP:** How did you develop your career?

Tančič: While I was in primary school in Slovenia, my parents bought me a small point-and-shoot Pentax camera. I was super-excited using it, then one day it was lost on a school trip, and I was super-sad. A year later, I got my first Nikon SLR. So I started to do photography early on, but I wasn't confident that I could live as a photographer. Slovenia is small, but we have great photographers working in the country and abroad. In high school, I was doing photography more and more, and started winning competitions, shooting for magazines and teaching photography courses. I built my confidence with my studies of tourism management in college, then applied to study fashion photography at the London College of Fashion. That's the University of the Arts, London. One reason was that reportage photography was super-developed and saturated in Slovenia. I didn't want to be fighting in a small fishbowl with the bigger fish. I wanted to swim in a bigger fishbowl with fewer fish, plus I like to photograph beautiful women and not just be an image taker, but an image maker—to be a bit more on the creative side. I did my final college project in 3D, a technique my photographer friend Peter Gedei from Slovenia introduced me to. He's an amazing 3D cave photographer, published in National Geographic many times. I would joke with him, "Peter, your photos are fantastic, but the only thing missing in them is a beautiful girl." So I did this final project called "Mimicry," where I photographed female figures both dressed and a bit undressed around Slovenia and London in 3D despite initial resistance from my professors who thought I should go for something more traditional. It turned out to be one of the best projects that year and was exhibited at the college and some solo shows in London.

**DPP:** How did you end up basing yourself in Beijing?

Tančič: One day I received an email from China. "We love your 3D work, would you like to do the biggest 3D show in China?" At first I thought it was a scam or it wouldn't happen, but I responded, and Peter and I went to China together with an assistant and a manager for 10 days. We ended up producing 20 photos in 10 days working with great Chinese models in Chinese environments. A month later, I flew back to the country for a huge opening for the photographs in the center of Beijing. It looked like the Grammy Awards, with a red carpet and guests. This time I stayed longer in China and traveled around and found it fascinating. I thought it would be a good place to stay and try some work. So I moved here and became a commercial photographer. Now, three years later, I've returned to my photojournalistic roots, but I also now do more fine-art projects, which are based on portraiture, while continuing to do fashion and commercial projects. One of them, "Timekeepers," is an art-portrait-3D series.

China is developing so fast. Every photographer can find a niche here if they can bridge the cultural gap and find a way to position themselves. There's a lot of great creative energy going on. Even with the bad air and terrible traffic, China has become the land of opportunity.

See more of Matjaž Tančič's photography at matjaztancic.com, and follow him on Facebook at MatjazTancicPhotography.

OF HIS PHOTOGRAPHIC APPROACH to the North Korea project, Tančič says, "My concept was to photograph the normal people, the people that are always overlooked because they're not the ones you encounter on every tourist tour or fit into propaganda or antipropaganda, depending on your point of view. They're not marching soldiers showing how powerful and strong the country is, and they're not the hungriest political prisoners. I tried to capture these overlooked people as a study of present-day North Korean society. You can clearly see their fashion, their environment."



TAMARA LACKEY HAS BUILT HER CAREER BY GIVING BACK TO THE PHOTOGRAPHIC COMMUNITY,
AND NOW SHE'S USING PHOTOGRAPHY TO MAKE A DIFFERENCE GLOBALLY

# CHANGING THE WORLD ONE FRAME AT A TIME



By Tracey Clark >> Photography By Tamara Lackey

rowing up, a career in photography wasn't ever on Tamara Lackey's radar, and as an adult, she never even thought about becoming a photographer. With a background in management consulting and executive recruiting, it wasn't until she was on maternity leave in 2001 that she had the desire to improve her photography skills.

As she began taking pictures of her newborn, she experienced what she describes as "a sense of frustration" not being able to capture with her camera what she saw. With this new motivation springing from her yearning to take better pictures of her daughter, Lackey devoured every photography book she could get her hands on.

"It was the first time I had taken off of work so I had the time to do that," she recalls, especially since her baby slept a lot. "I just got better and better. And I began to think I'd like to take pictures of other families, too, so it was very organic in that way."

It didn't take long for her to determine she had found her passion and she slowly built a photography business, "learning on the job," as she says, for the next three years. She then gathered all of the things she had learned along the way and wrote her first book, *The Art of Children's Portrait Photography*. Her mission was, she notes, "To put, all in one place, all the things that I felt I could have used in a book, things that might have helped me skip ahead a few years right at the beginning."





Sharing valuable insights with those who might be just starting out in children's portraiture seemed like a way to give back to the growing portrait photography community that helped her on her own journey.

That first book, though, was far from the only thing Lackey has done to give back. She and her husband have always been focused on children's charities, and they chose to give 100%

of Lackey's book profits to benefit the organizations Save the Children and the Worldwide Orphans Foundation.

One book grew into five books over the course of the years, with her most recent title being the newly self-published, *The Family Posing Playbook*. Her career has continued to grow, from shooting, to writing, to a coveted position as a Nikon Ambassador. After being introduced to Nikon equipment rather late into her photographic career, she soon developed an affinity for the gear. As with many other things in her life, she surrounded herself with information on Nikon gear and photographers, and in March 2013, she received an invitation to be a part of the Ambassadors program, something she's truly proud of.

In talking with Lackey about the many facets of her work, one is not only charmed by her warmth and authenticity, but also impressed with the plethora of projects she's involved in. It's no wonder that the advice she shares with new photographers is to "try to find a way to diversify."

"Being there with them 24/7 for a few weeks, you get to know a lot about these kids." Lackey was so insistent on capturing the spirit of each child that she would often shoot one day and turn around and reshoot days later, after getting to know the kids a little better every day.

Tamara Lackey always planned to have a family where she would adopt children, but she didn't expect she'd use photography to improve the lives of so many orphans in the United States and in Africa. Her work as a renowned child and family portraiture educator helped gain exposure for her not-for-profit Beautiful Together.







Beyond her portrait work and her work with Nikon, Lackey's unique partnership with Fundy Software's Designer line is continued proof of her ability to diversify. An evangelist of getting images out of drawers, off of hard drives and into tangible photo albums, it makes sense that she would partner with album company Finao to create her own line of products to satisfy the needs of her clients. Her Tamara Lackey's Lush Albums are everything she was looking for-eco-friendly, aesthetically impeccable and created with software that makes the whole process simple, eliminating the timeconsuming and often aggravating back and forth she had previously experienced with other album companies. It took 17 months of work to get it right, but she says it was worth it.

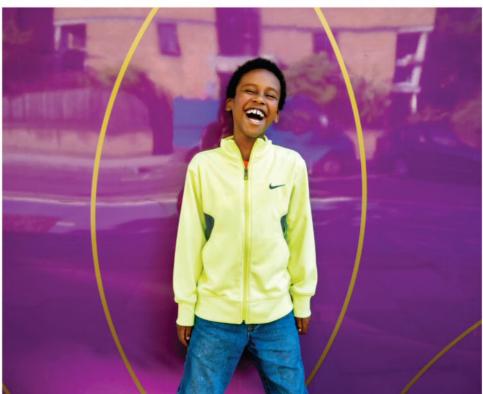


During the process of adopting her own children, Lackey saw that small projects could make a huge difference. Her organization has wired classrooms for electric lights, removed broken and dangerous fences, and renovated unclean and unhealthy bathrooms.

Her most passionate work, though, is with the not-for-profit she started, Beautiful Together (beautifultogether.org). More than anything else, this organization seems like the perfect culmination of all the things that matter most to Lackey and the focusing point of her resolve to use her photography to give back to the world.

While she hadn't envisioned becoming a photographer, even as a child she had a plan for a family that included both birth children and adopted children. It was always what she pictured for herself. The Universe, working in mysterious ways, brought her husband, who was, in fact, adopted (as was his sister). Laughs Lackey, "That's not why I married him," but she admits, "It's a lovely tie-in." And just as she had always envisioned, a





few years after the birth of their first daughter, they adopted a son from Ethiopia.

It was when she and her husband spent a week there in the adoption process, living at the orphanage where her son spent the first nine months of his life, that Lackey says the statistics of how many orphaned children there were in

the world "really began to crystallize to this face and that face and this face." And when they got home, they agreed they would continue to grow their family through adoption.

Lackey and her husband adopted another daughter, a three-year-old from Ecuador, and are currently in the process of adopting another son, a five-year-old from Ethiopia. Today, her kids are 14, 11 and 10, with her youngest still in Ethiopia while the long adoption process continues. With an undeniable passion for children and family, she and her husband were actively donating to a variety of child-focused causes when they decided to create something themselves as "a way to funnel those funds from everywhere into one

specific area that was just in support of children waiting for families," says Lackey. That's the focus of Beautiful Together, and while it's not a photography project, the photography tie-in "is massive," she notes.

The photographer recently shared a story on her blog about a portrait project she and her husband did at the Ethiopian orphanage where her son still lives, awaiting the completion of the adoption process. When asked about it, Lackey explains, "It wasn't even going to be a big project. It was going to be a side project that we would do because we were there, but it ended up being the thing that had the biggest outcome."

The idea was simple—to photograph the children and hang their portraits on the walls of the orphanage to bring warmth to an atmosphere that Lackey describes as "austere." As the idea evolved, she took it upon herself to use the portraits as a way to tell as much as she could about each child.

"Being there with them 24/7 for a few weeks," she says, "you get to know a lot about these kids." Lackey was so insistent on capturing the spirit of each child that she would often shoot one day and turn around and reshoot days later, after getting to know the kids a little better every day.

A project like this might not seem like one with great challenges, but there was a lot at play, being at an orphanage in Africa. "I couldn't just put up what I wanted to put up, like beautiful wood frames or something," she says. "It had to be something safe, in case something fell off the wall,

Lackey has hung exhibits all over the world, but she never has had a reception as enthusiastic as the one from the children in the Kidane Mehret Children's Home in Ethiopia. The experience helped change how she views the power of photography to make a difference in people's lives.



and it had to stick to any surface and be coated with a protective coating." When the day came to hang the prints, something that hadn't been anticipated as being a big event, the response was overwhelming.

As each box was opened and large prints were pulled out, the children screamed out with excitement and delight. And as the work went up on the wall, nuns and caregivers were reduced to tears. "It was the best photography reception I've ever had in my life," Lackey remembers. "I've had the fortune of displaying my photographs in some neat places, but that was nothing like this. It just blew everything away! It was such a powerful way to share what photography can mean. And it was unexpected. The actual unveiling turned into such a ceremony of sorts—it was a very powerful experience."

Lackey hopes that by sharing this story, it might inspire other photographers to do something similar because there's so much need for good photographic work. And she should know. Explaining a disconnect in the adoption process, Lackey shares, "Having looked at so many children online that are waiting for adoption, it's stunning how poor the photos are. The photos are where you feel it, the 'I can connect with you,' and there's so much of that missing because sometimes they're so poorly lit, you can't even see their eyes or their face, much less

get any sort of idea of what their spirit is like."

Lackey admits that it's not easy to make change happen, even when you're doing pro bono or philanthropy work for a cause. "It can take a lot of work and effort," she says. "What I've learned doing philanthropic work, everyone is so stretched in the space of caring for children and family—foster care, group homes, orphanages—that even trying to do something good can be really hard."

But, as her work can attest, when you have an exciting idea, the fortitude to shape it and the determination and drive to do what it takes to get it off the ground, amazing things can happen.

The same goes for a career in photography, or any other business you're looking to create. Once you've resolved to create something, you have to keep working at it and you have to keep giving back. Lackey acknowledges that so much of what she has learned about building a photography business over the years has benefitted the building of Beautiful Together.

It's as if all of the work Tamara Lackey is doing, whether professional, personal or philanthropic, is woven together seamlessly, her hard work and her heart equally evident in every photograph she takes.

To see more of Tamara Lackey's photography, visit her website at tamaralackey.com.







## Trust your Workflow to G-Technology. Vincent Laforet Does.

Vincent Laforet risks his life to capture images from high above. But he dare not risk losing the beauty he captures as a result. That's why he relies on G-Technology: storage gear he trusts. From capture to transfer, edit and archive, G-Technology delivers the speed and reliability Laforet demands. So why don't you?

Learn more at g-technology.com/air









### 

Bert Monroy isn't your average artist. He's part painter, part retoucher, and as far as we can tell, part camera. Monroy's complex, intricate work includes a level of detail that seems impossible for a human to appreciate, let alone duplicate. For decades, Monroy has not only witnessed, but has helped create, incredible advances in digital imaging technology, beginning in 1984 when he had access to the first Macintosh model, the 128K.

The New York-born, Berkeley-based artist is a member of the Photoshop World Dream Team, and the technical guru creates digital paintings that are striking in detail and reveal a highly refined sense of awareness of his surroundings, which he's able to convey onto a blank canvas.

We caught up with Monroy at the 2015 Adobe MAX conference in Los Angeles, where creative professionals gather to learn about new software tools, get hands-on training, refine workflow, network and perhaps, most importantly, get inspired. Monroy was a presenter at the conference, and we talked to him about his work and the lessons photographers can learn from his creations.

Look at Bert Monroy's photorealistic paintings at a distance, and it's impossible to tell them from photographs. Get closer, and the work is even more astounding. The details in each image are laboriously created with painstaking attention to detail, a skill that would greatly benefit any photographer. OPENING SPREAD: "Amsterdam Mist" is featured on Monroy's website, with interactive functions that allow you to zoom in to examine all the beautiful details.

ABOVE: "Times Square." RIGHT: "Red Truck"; "Blue Truck".

**DPP:** What's the preferred term for the work you do?

Bert Monroy: I call it hyperrealism. There's a genre called photorealism, but they kind of adhere to the photograph with a depth of field in their paintings. I followed the work of photorealists like Richard Estes and Ralph Goings, but when I tried to do paintings like theirs, I found myself not wanting any part of it to be out of focus. In my work, you see a bolt in a sign right in front of you and you look down the street 20 blocks inside a building, and both are in focus. Wherever you look at in most of my paintings, it will be in focus. It's actually more like being there than a photograph. I can create more depth of field than a camera and I get more detail. If I put a little ant crawling up a wall and you get up real close, you can see the ant.

**DPP:** Your largest project, to date, "Times Square," must have been a massive undertaking.

Monroy: It took four years. I had already done a train station in Chicago called "Damen" that took 11 months. That was my first panorama. I was inspired to do it because printers had evolved to the point where you could go up to 44 inches, so I created that piece 40 inches by 10 feet. Then 64-inch printers came out, and I realized that this was the time to do Times Square. The only way to get the feeling of



Times Square is, like, Times Square, big and bold. When I put together how much of the scene I wanted to show, it ended up 5 feet wide by 25 feet long. Then Epson told me they were working on a translucent material that you could backlight. I thought, I'm doing an image of light at night, to backlight it would be phenomenal. So Epson built a gigantic lightbox and printed the piece on a GS6000. My tests were done on my Epson 9800, which is a 44-inch printer, and I also was constantly printing out 8x10s and 13x19s on my Epson 3800 to see if I could give an area more detail or if I had gone too far, as well as seeing how the people were looking. I finished it in 2007. The Computer History Museum in Mountain View, California is now building a lightbox so they can put it on exhibit.

**DPP:** Are you using photographs as a base for your images?

Monroy: For the Times Square piece, I did a lot of photo studies, taking around 6,000 over 10 different trips. Now I could also use Google Street View, zoom in and take a screenshot. "What does this trash can look like?" "What does that pole look like?" "What does that sign say?" A lot of Times Square isn't real. There's a billboard for Wacom, a billboard for Apple. Those billboards didn't exist. The people on the street are all friends and family. I take a lot of artistic license.







Monroy's work with light and shadows is exceptionally meticulous. He turns everyday scenes into masterpieces by looking at the way light interacts with the objects around it in the same way that photographers should work with light. ABOVE: "Lunch in Tiburon."

**DPP:** So take us through the process.

Monroy: First, I take photographs for reference and then I sketch. By sketching, I get the dimensions and the angles based on how the eyes see rather than how the camera captures it, without the distortion of a camera lens. I used to do it on paper, but more and more, I'm sketching on an iPad. I write notes on details that the camera might not pick up and I might forget. Then, when it comes time for me to work, a lot of it just gets created on my own. I might add dirt and scratches and peeling paint to give something a little more soul, a little more character, to add my own feelings into a painting.

I usually start in Illustrator with a blank canvas and work up my perspective. I develop a horizon line, I'll plot out the vanishing points, then from

there, create the vanishing lines of where buildings are going to be so I can line up all the windows in the right way and so on. I create the vertical lines so I'll know where's the end of the building, where's the beginning of it. Then those paths are brought into Photoshop where I'll first stroke them into a layer called guides. Then I use those same paths again to let's say, it's the windows—make them a selection, then fill them with a gradient and stroke them with some tone and so on. I keep building and building, layer on top of layer.

DPP: How many layers did you use for "Times Square"?

Monroy: Somewhere in the neighborhood of 750,000. But that's just not one file. The actual main file is made up of multiple files-building on the left, building on the right, up 7th Avenue.



Let Outdoor Photographer Magazine give you the tools, techniques and inspiration to capture your favorite subjects in a whole new light. Our expert staff of editors and columnists are committed to showing you how to take better photographs. Whether your interest is scenics, wildlife, travel or sports action, Outdoor Photographer will inspire and inform you.





"Venetian Night"

Each one of those individual files was made up of hundreds of other files. For instance, up Broadway, there would be Building Number 1, Building Number 2, and in those files, there would be a file for the storefront, and the storefront will have another file for, let's say, the stuff in the window. There's one where they're selling skateboards. So there's a file for skateboards. And there will be a lot of files for different skateboards, which would then get assembled into the scene of the window, which then gets put into the scene of the storefront,

which then gets put into the scene of the overall building.

The comp file is where the main files are put, but then there are hundreds of folders for all the different elements that eventually get put together for the overall scene. I go to 100% on the original file—which I call the "Once Over" file—on my viewing monitor, which will show me a little portion of the painting. I start in the upper left-hand corner and look it over. I'll say, "Oh, this shadow is off," then I go back to the files and fix it, then put it in there, then move down, then over, then up, and when I get to the

lower right, that's the last segment of the painting, and make any adjustments needed in that area. I'll flatten the file, call it by its final name, and I consider the painting finished.

**DPP:** How do you work on a computer with such a huge file before it's flattened?

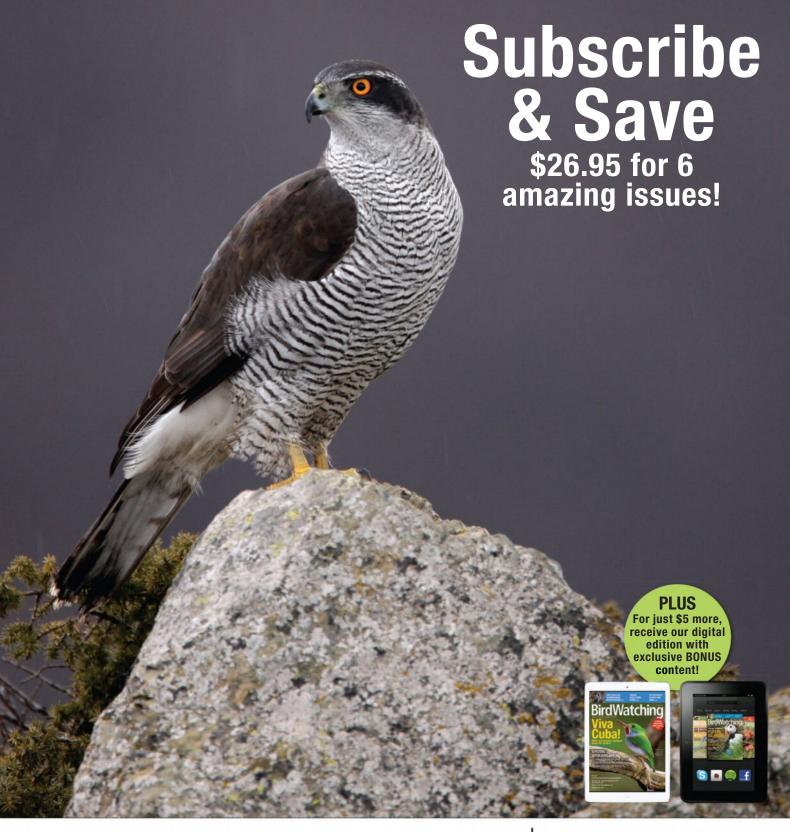
Monroy: In pieces. My new Mac Pro is fully loaded with 64 gigs of RAM. I can handle my current paintings on a machine like that, but there's no challenge, so what I'm doing with my next painting, "Le Dome," based on a restaurant in Paris, is I'm doubling everything. I'm going to get a lot more detail than I ever did before. The Amsterdam piece I did four paintings ago is the one that gave me the desire to go this way. The buildings and the trees were intricate so I did everything at 200% of what I needed. Each tree file was close to 5 gigabytes.

Most of the paintings from "Oakland," which was the point where computers got powerful enough to render enough detail, are 197 megabytes flattened. You have to remember that a 15x20-inch at 480 ppi file can be blown up on standard printers and retain all its detail. "Times Square" was 6.52 gigabytes.

**DPP:** What about paper?

Monroy: For paper, I go from canvas to flat mattes to high gloss. It depends on the image. For instance, the Venice piece I unveiled at Adobe MAX is printed on canvas. I originally thought canvas would be great for "Amsterdam Mist" because of the textures of the fog, but when I tried it, I saw that I was losing a lot of the fine detail in the grain of the canvas in the buildings so I decided to go with a glossy paper.

### Attract • Find • Identify • Enjoy



Follow *BirdWatching* magazine to stay current on the latest bird news!

Visit BirdWatchingDaily.com





**BirdWatching** 





'Ventura'

DPP: The technological advances you've witnessed and experienced are incredible. What's your setup these days?

Monroy: I use a Mac Pro with a 2.7 GHz 12-Core Intel Xeon E5 processor, 64 GB memory and a 30-inch Apple Cinema HD display, a Cintiq 24HD, a Q171b display and a Cintiq W1310 display. I have a Wacom 24-inch Cintiq HD and the Cintiq Companion 2, which I use to contain the panels for the various software in use. I also have a Wacom Intuos tablet to control the other two monitors that aren't touch screens. There are multiple drives that include a Drobo, multiple G-Technology and Seagate drives, for a total of 38 TBs of storage on this machine.

I used PixelPaint for my first painting in color. Photoshop wasn't out yet. PixelPaint was really cool, but it had only 256 colors and you were limited to 72 dpi. So things looked a little coarse. PixelPaint 2.0 introduced dithering—you were still limited to 256 colors—but instead of taking up 50 colors so you could get a smooth gradient in the sky, you could take up maybe four colors and it would dither, create a gradation, between each layer of color and create a kind of a hatch pattern, but your eye would be deceived into seeing a smooth transition. When Photoshop came out, things started to look more real.

DPP: In many of your finished pieces viewed from a little distance, it's almost impossible to believe that you're not looking at a photograph.

Monroy: That's what I like to hear. I paint all of this in Photoshop. They're vectors. I'll create a wavy path that I'll then stroke. That's how the neons in my movie marquee painting, for instance, were done. They were stroked with a solid color. That solid stroke was then given a little glow, then I go inside in a separate layer that's clipped with it. I'll start painting a little dirt and dull the light at the edge because that's where it gets a little dim. That comes from observing how things actually work. I tell my students to go through life with their eyes open.

See more of Bert Monroy's work at bertmonroy.com.

# MAGAZINES



#### Get The Digital Editions Now









Shop B&H, where you will find all the latest gear at your fingertips and on display in our SuperStore.

Download the B&H App







www.BandH.com
Where you will find information
on over 400,000 items



Visit Our SuperStore 420 Ninth Avenue, NYC 800-336-7520 | 212-502-6324

## B&H - The leading retailer of the Latest Technology



- A Apple MacBook Pro with Retina Display #APMBPMGXCZLL \$2,29900
- Sony Alpha A7S Mirrorless Camera #SOA7SB \$2,49800
- Panasonic Lumix DMC-GH4 Camera with Interface Unit #PADMCGH4BK \$2,29799
- B Profoto B2 250 Air TTL To-Go Kit #PRB2250ATTGK \$1,99500
- Zeiss 135mm f/2 APO Sonnar T\* ZF.2 Lens #ZE1352ASZFN \$2,12200
- J 3DR Solo Quadcopter Drone (No Gimbal) #3DRSOLO \$9995
- © Nikon AF-S NIKKOR 300mm f/4E PF ED VR #NI3004E \$1,99695
- G Litepanels Astra 1x1 Bi-Color LED Panel #LIA1X1BC \$1,35000
- Nikon D750 DSLR Camera with 24-120mm Lens #NID75024120 \$3,59695
- D Oben CT-2491 CF Tripod and BC-166 Ball Head #0BCT2491K2 \$664<sup>95</sup>
- H Canon EOS 5DS DSLR Camera #CAE5DS \$3,69900
- DJI Inspire 1 Quadcopter 4K Video and 3-Axis Gimbal #DJINSPIRE1 \$2,89900

Cash in or Trade up
Used
Equipment

We Buy, Sell, and Trade



Visit www.BandH.com for the most current pricing

## Hi-TechStudio

#### The Golden Age Of Printing

Today's printers are technological marvels, ready to create a masterpiece at a moment's notice By David Schloss



A sample of the output used for our tests shows that both the Canon and Epson printers create beautiful and nearly identical images, despite differences in their technologies.

The latest desktop professional printers are incredible machines—their output is astounding, and the amount of technology stuffed inside these relatively affordable little boxes is mind-boggling.

At a recent press briefing with Canon for the new imagePROGRAF PRO-1000 printer, the product managers talked about the 27 different temperature sensors inside the print head that communicate together to make sure ink flows consistently and without clogging. Epson product teams talked about their variable-droplet sizes on the SureColor SC-600 and how the print head can produce bubbles of ink as teeny as two picoliters, a droplet of ink so small as to be only visible under a microscope. Neither technology is visible, but both are part of the amazing inner workings of a printer.

Printers fall into the "you can't judge a book by its cover" category, with the benign and unobtrusive exteriors housing a Willy Wonka collection of motors, pulleys, sensors and wires. You also can't tell from surface looks exactly how precise a printer has to be. To create good-looking output, a printer has to suck in papers of various different thicknesses, widths and lengths, then move them forward at exactly the right rate in order to spray microscopic ink from thousands and thousands of individual nozzles.

These devices have to provide consistent output-print after print, day after day. And they have to be affordable enough for the average studio. That's a pretty tall order.

Toward the end of 2015, both Epson and Canon updated their desktop

photographic printer lines, introducing new models with new technologies. We put the newest devices, the Epson SureColor P600 and the Canon imagePROGRAF PRO-1000 through their paces, pitting them head to head in a variety of print tests.

The Epson P600 is the smaller of the two printers, outputting to sheets as large as 13x19" versus 17x22" for the Canon PRO-1000. Epson produces a 17x22" printer in the class, the P800, but we had already received the Epson P600 when the Canon PRO-1000 was introduced. Since the Epson P600 and the P800 largely share the same internals, I reviewed the Canon and Epson devices side by side, though I'll note where the differences lie between the models.

#### **Desktop Champions**

The Epson P600 had a bit of a head start on the Canon PRO-1000, launching a few months before the Canon device. But Epson also has a head start in the market—they have been consistently producing a wide selection of excellent desktop-sized professional printers without a hitch for decades. Their main rivals, Canon and HP, haven't been as visible as Epson, despite making some very solid devices. HP left the desktop photo printer market some time ago, leaving Epson and Canon to battle it out, and the smaller Canon photographic printers straddle the line between being consumer and pro devices.

Both companies have taken design cues from their consumer-grade printer divisions, integrating conveniences like full-color LCD screens for control of printer functions, complete with "Home" buttons and simplified

WiFi printing configuration. It's this wireless printing functionality that has me particularly excited, as it eliminates the clutter caused by running Ethernet cables around my studio just to reach my printer table, and the LCD screens make setup much easier than previous printers that either lacked LCD screens (and had to be set up via software) or had small, difficult-to-navigate displays.

Both printers look much more "modestly" designed now, as well, with black cases and understated, minimalist lines. Sticking with the traditional black exteriors usually found in professional camera gear suits these printers, too. The Canon PRO-1000 sports a red band around it, which Canon's PR team and product managers seem especially proud of because, they say, it ties the printers into their pro lens lineup, which features the same detail.

No matter how svelte these printers are when closed, when printing they're still awkward-looking, with expanding print trays and paper sticking out of the tops. Operating the printers takes considerable space as a result, especially if the rear manual-feed slots are used, since they require the same space behind the printer as the size of the paper itself. People who visit my office often think it's odd that my printer sits perpendicular to the front of the table, but in reality, it's the best way to access all the necessary components.

Both printers are simple to set up, and unpacking them and installing the ink cartridges takes about 10 minutes for each printer—mostly to remove the myriad pieces of tape holding the printers together. (I joked with a colleague that the main difference in setup is that Epson uses blue tape while Canon uses red.) The Canon's print head isn't pre-installed in the printer, adding an additional step. It also means that the PRO-1000 user can replace the print head should it become irreparably clogged.

Both printers represent the pinnacle

of desktop printing technology for the respective companies, with their latest print heads, ink delivery systems, processors and paper management techniques. The Epson SureColor line replaces the long-running Stylus Pro printer product, while the Canon imagePROGRAF PRO-1000 merges the company's consumer and professional products into a device with completely revised internals.

#### **Specifications**

The Epson SureColor P600 has a maximum resolution of 5760x1440 dpi and can create borderless prints on 13x19" media. It also has a roll paper adapter, which makes it particularly well adapted to the high-volume portrait or wedding studio.

Epson uses a nine-ink UltraChrome HD pigment ink configuration (photo black, matte black, cyan, vivid magenta, yellow, light cyan, vivid light magenta, light black, light light black) and can automatically switch between photo and matte black. The P600 shares the photo black and matte black channel, so some line cleaning is required between matte and glossy print jobs. The P600 uses 23ml cartridges, while the larger, 17x22"-capable P800 uses large 80ml cartridges.

The P600 produces ink droplets as small as 2 picoliters, while the P800's

smallest size is 3.5 picoliters, making it theoretically difficult to create the same sharpness as the P600, though at this picoliter size, it's difficult to say how much sharper 1.5 picoliters gets you. Thanks to the multiple levels of black ink, the printer is an excellent choice for monochrome work.

Connectivity options abound on the P600, including the aforementioned WiFi connectivity, Apple AirPrint and Google Cloud Print (for printing straight from mobile devices), Epson Connect printing (for remote printing), USB 2.0 and Ethernet. Straight out of the box, the P600 can connect with any device in a modern studio, from tablet to tower.

The Canon imagePROGRAF PRO-1000 has a maximum resolution of 2400x1200 dpi, and it can output borderless prints up to 17x22". The printer uses the company's new L-COA Image Processing engine and a 12-ink Lucia Pro pigment ink system. Those inks are matte black, photo black, cyan, magenta, yellow, photo cyan, photo magenta, gray, photo gray, red, blue and a Chroma Optimizer designed to reduce metamerism. Each of the inks, which come in 80ml tanks, has its own channel, so the PRO-1000 doesn't need to purge ink between output to matte and photo papers.



The printer also has sensors in the print head that determine if one of the channels is clogged and replaces that channel with a surrounding one, eliminating the white coverage gaps that occur when a printer's nozzles clog.

The PRO-1000 has a unique system for feeding and tensioning the paper under the print head—in addition to rollers, it uses vacuum suction to pull the paper into place. Canon claims this results in better print coverage, and it also allows those using thicker paper to create paper profiles that account for the thickness of the material.

The PRO-1000 is rife with connectivity choices, including WiFi printing from computers, Apple AirPrint, wireless PictBridge printing, PIXMA Cloud Link, and the traditional USB 2.0 and Ethernet connectors.

#### **Configuration and Image Quality**

Both printers were relatively easy to configure and use, though, as has always been the case with photo printers, there were some hiccups. Once the inks were loaded, both printers took some time to charge the ink lines, during which time I took the opportunity to install the drivers.

As I don't have a CD drive attached to any of the computers in my office, I downloaded the drivers online, which was easier to do with the Epson drivers than the Canon ones. The Epson SureColor P600 drivers are available from a link on the company's product page on their website. I wasn't able to locate the drivers on the Canon site, and instead turned to a site that hosts drivers for download for numerous types of computing devices. (The site is supportdrivers.info, and it's a good bookmark to have.)

By the time the printers were charged, the drivers were installed and ready to go. For the first set of tests, I selected four images that would represent both common photographic subjects, as well as some things that are typically problematic for printers.

One image featured a Halloween



E ON THE WEB>>

To learn more about

professional-quality

the DPP website at

digitalphotopro.com

prints, go to the Gear and Reviews tab on

the tools and the techniques for beautiful

Canon imagePROGRAF PRO-1000

costume with both bright orange colors and fine detail on the costume's feathers. I was especially interested in testing this image because orange is a vibrant color that needs to be created in

both printers through careful mixing of other colors, and is often a weak spot on less professional printers.

Another test image leaned heavily toward blue and green tones; one was a close portrait with detail and skin tones, and

the final one was a very dark, but very detailed image.

This last one, taken in the predawn hours before the Albuquerque International Balloon Fiesta, has become one of my favorites to use as a printer and monitor stress test. A photograph of a vendor of small children's toys and stuffed animals, the image has multiple overlapping shadows across pavement, neon toys in the background and loads of detail, thanks to the resolution of the Canon EOS 5DS, which was used to capture the photo.

I had already printed this image at 13x19 on the Epson in my studio, and

had printed this same photo at Canon's media introduction of the PRO-1000, so I knew the printers both handled this level of shadow detail incredibly well when the print was large, but I

wanted to see if they could pull it off at a smaller size.

In order to standardize on the paper surface, I used the professional-grade luster paper from each of the manufacturers with their respective printers. (I also

verified the results later by printing on a third-party paper that had ICC profiles available for both devices.) Both devices were set first to their highest resolutions (2440x1400 for the Canon and 5760x1440 for the Epson) and prints were made with the printers set to the correct paper types, and any high-speed settings were disabled.

Once the prints came out, I let them dry for a bit and then shuffled them together. Since the Epson paper has branding on the back, it was easy to do a blind evaluation and verify my results. The prints were nearly identical, with color rendition and tonality the same across all the prints. At first,

I wasn't able to tell the printers apart, but side by side I noticed one set of prints had slightly darker blacks and ever so slightly sharper detail. Surprisingly, the denser blacks and slightly sharper images belonged to the Canon, even though the top resolution is lower than that of the Epson.

To test this a bit further, I printed out a number of the same images on the Epson at different resolutions and compared them. (I also asked my wife, who has better close vision than I have, to evaluate them.) There's very little perceptible difference between prints. Color density and the contrast between regions are improved at 5760x1440, but to the naked eye, there's very little difference.

I also printed multiple images at 13x19 on both printers and found the same results held true—the highest resolution of the Canon print just very slightly edged out the Epson print at its highest resolution.

#### **Monochrome**

Both companies advertise their printers as being excellent monochrome output devices. A few generation of printers ago, there was a huge aftermarket conversion business, with companies providing monochrome ink sets and printer profiles to replace the colored inks in printers like Epson's original Stylus line. Companies like Canon and Epson reacted to this demand for monochrome output by adding more grayscale inks and improving their monochrome output algorithms and techniques.

Both the Epson SureColor P600 and the Canon imagePROGRAF PRO-1000 create tremendous monochrome output. I tested both true grayscale output and true black-and-white atonal images, and they all were impressive. The Canon output was a slightly deeper black by default, but I was able to tweak the Epson output in Photoshop to rival its performance.

Photographers who make their living off of grayscale printing can easily rely on either of these printers.

#### **Studio Usage**

No matter how far desktop photo printers have come, there's still some frustration in getting them to switch between paper sizes or between different paper types—at some point, there's some cursing and fiddling with buttons while trying to figure out why a job won't print.

I won't point fingers here, as both of the devices were equally vexing, but during one set of tests I cranked out a number of 8x10" prints with no issues. I then walked away for dinner, came back and tried to print again, and suddenly my Mac couldn't connect to the printer even though it was still powered on and connected. It was visible to me, but when I tried to print, jobs just piled up. I had to cycle the power

PictBridge in Canon cameras with WiFi connectivity built in.

Both printers are quieter than previous models, especially the Epson, which only emits a faint noise as the paper is advanced. The Canon model is also quiet, but in our tests, a fan was active during printing that's louder (though not by much) than the Epson.

#### **Conclusions**

If you're looking for a printer that produces 17x22" output, you'll need to get the Canon imagePROGRAF PRO-1000, or the Epson SureColor P800, which produces the same size output.

If 13x19" output is all you need, the Epson SureColor P600 takes up less space than the larger Canon, naturally.

## Printers fall into the "you can't judge a book by its cover" category, with the benign and unobtrusive exteriors housing a Willy Wonka collection of motors, pulleys, sensors and wires.

off and on, but I wondered what could have happened in the hour I was eating dinner to have caused the printer to suddenly vanish.

Moments later, I tried to load a sheet of 13x19" paper into the *other* printer and was told repeatedly that there was no paper loaded while I stood there yelling at an inanimate object.

There's also the confusion of how the PRO-1000 refers to their various paper-feeding mechanisms. The Canon PRO-1000 calls the slot on the *top* of the printer the rear tray, but the slot behind that on the actual *rear* of the printer is referred to as the manual feed tray.

The ability to wirelessly print from just about any device makes these printers more useful in the studio than any previous generation of devices. With the Canon printer, it would even be possible to print wirelessly straight from a Canon camera with wireless

The Epson line also has an available roll printer, which the Canon does not, so anyone looking to print to continuous rolls needs to pick up the Epson.

There's only a mild price difference between the devices, as well. The Canon printer currently has a retail price of around \$1,300 versus \$1,200 for the Epson P800. The smaller Epson P600 is a bargain at \$800. The Epson 80ml ink cartridges for the P800 are about \$55, while the 80ml cartridges for the Canon PRO-1000 run about \$60.

The Canon and Epson printers produce absolutely incredible images. Today's photographer would be well served with any of these devices, and they make better images, by far, than printers of just a few years ago. Whether output is for client delivery, gallery use or simply to evaluate one's images, these printers are a fantastic investment.

#### The Paper Chase

If you're only using your printer manufacturer's paper, you're missing a world of incredible printing possibilities

The sample pack of paper that came with your printer usually provides a great selection of paper from the manufacturers, but that doesn't mean you should stick with just the professional glossy paper in the package. It's no secret that the printer manufacturers don't actually make their own paper, though they do specify the characteristics and the coatings for their sheets to optimize them for their devices.

There are a number of notable paper manufacturers that don't come bundled in printer boxes that provide excellent image quality across a wide range of surfaces and thicknesses. There are also some specialty papers from the printer companies that often escape notice.

Here are some of our favorite papers for truly breathtaking output, though these companies all offer a whole host of excellent papers.

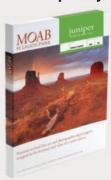
#### Red River 68lb. UltraPro Satin 4.0



The company's bestselling paper, UltraPro Satin 4.0 is designed to feel like a traditional photo lab print, with a toothy semigloss coating, and the new formulation

gives it a brighter white base. UltraPro Satin 4.0 is heavier than most inkjet paper at 270 grams, which gives it a great feel, and it's particularly well suited to black-andwhite prints. Sizes: 4x6" through 13x28" sheets, plus rolls redrivercatalog.com

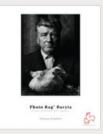
#### **Moab Juniper Baryta Rag 305**



Moab by Legion's Juniper Baryta Rag 305 is a 100% cotton paper that uses barium sulfate—oddly called baryta in the industry—to whiten the paper instead of optical whitening chemicals that are thought to lead to print fading. Moab's double-weight paper has a coating designed for inkjet output and that keeps the droplets of ink from spreading to neighboring

regions. The result is a paper that has the best characteristics of a heavy rag paper, but the resolving power of a modern photo paper. Sizes: 5x7" through 17x22" sheets, plus rolls moabpaper.com

#### Hahnemühle Photo Rag Baryta



Another great barium-sulfate paper, Hahnemühle's 315g Photo Rag Baryta is a museum-quality archival paper that has a modernly formulated photographic surface. The result is a heavy, impressive paper that produces razor-sharp images, and it's often used for everything from gallery exhibits to

greeting cards. Sizes: Photo cards, A4 through 17x22" sheets, plus rolls hahnemuehle.com

#### **Epson Metallic Photo Paper**



Epson's metallic line of papers provides a silver-like finish that adds depth and vibrancy to a range of images—most particularly, monochrome prints. Fine artists, portrait photographers and wedding photographers have long turned to metallic papers to help bring out the best in a portrait, and the Epson

line—which includes Glossy and Luster—offers great sharpness and dynamic range, something that's hard to do on a metallic surface. Sizes: 8.5x11" through 17x22" sheets, plus rolls epson.com

#### Canson Infinity Rag Photographique



This 100% cotton paper from Canson comes in two weights, 210g or 310g, to suit different output needs. The museum-quality paper has a bright, white surface the company says is due to "natural minerals" added during manufacturing (we think it's probably barium sulfate) and has a

very high-rated Dmax (the level of "black" possible), making it an excellent choice for delivery to clients or for fine-art photographers hanging exhibitions. Sizes: A4 through 35x46.75" sheets, plus rolls canson-infinity.com/en

#### Innova FibaPrint Warm Cotton Gloss



Innova doesn't have a name as well known as some others, but many exhibition printers use them regularly. While most of the 100% cotton papers on the market use brighteners, the Innova FibaPrint Warm Cotton Gloss has none, which gives it a darker tone that's well

suited to monochrome work. The inkjet surface coating is well integrated into the paper's texture, so ink doesn't look too shiny or reflective on the surface. Sizes: A4 through 17x22" sheets, plus rolls innovaart.com

#### **Museo Silver Rag**



Based on the name, you might think that Museo Silver Rag is a metallic paper, but it's actually a rag cotton paper with no optical brighteners.

The paper has a very good Dmax and a wide gamut thanks to its semigloss coating. It's another paper that's great for monochrome images, but stands up well to vibrant color photos, too, when super-white paper isn't desired. Sizes: A4 through 35x47" sheets, plus rolls museofineart.com

#### **Ilford Galerie Prestige Smooth Pearl**



Ilford, one of the biggest names in the darkroom era, now produces a line of well-regarded photo papers, many of which have a remarkably similar feel

to their chemical-process papers. The Galerie Prestige Smooth Pearl paper has the company's latest optical clear coat for very sharp images, with a wide color range. This paper dries instantly, and is resistant to fingerprints and smudges, making it good for clients who are going to manhandle the images. Sizes: 4x6" through 17x22" sheets, plus rolls ilford.com

#### **LOOKING FORWARD**

(Cont'd from page 80)

percentage of women in the industry.

The 2003-2005 survey from the NEA shows that 42.8% of the 77,767 professional photographers women. It also shows that 34,530 photographers disappeared from the market, which is interesting, as it corresponds with the rise of digital photography. By 2005, a lot of jobs were being eliminated in photography, largely from the competition caused by the ability of digital photographers to get more done in less time and the consolidation in the publishing world.

At this point, we have to jump to data from the Bureau of Labor Statistics, which calculates occupations data slightly differently than the NEA, but shows that, in 2010, 39.4% of the photographers were women (close enough to match that 42.8% using the NEA data's sampling), and that by 2015, a full 51% of the professional photographic workforce were women.

Let that sink in for a moment. In 2015, more than half of all professional photographers were women.

In the next issue of Digital Photo Pro, we'll look at some of the incredible women shaping photography today, but we'll also ask, "Why aren't more companies paying attention to women as customers?" while lauding those that do.

There certainly are a lot of entrylevel products that still, embarrassingly, are referred to as being for "soccer moms," but what about pro gear? If more than half of all professional photographers are women, why do so many products and services feel like they're targeted to the same market as the photographer of the 1970s?

So be sure to check out our profiles of several astounding and inspiring photographers (who happen to be women) in the next issue, as well as the trends and products that this changing demographic brings to photography, and that make photography a more inclusive space every day.

You can follow David Schloss on Twitter and Instagram at @davidjschloss.



#### STATEMENT OF OWNERSHIP

Statement of Ownership, Management and Circulation (Required by 39 U.S.C. 3685)

STATEMENT OF OWNERSHIP

Statement of Ownership, Management and Circulation
(Required by 39 U.S.C. 3685)

1. Title of Publication: DIGITAL PHOTO PRO 2. Publication No. 1545-8523. Filing
Date: Squember 72, 2015. Issue Frequency iB. Monthly Energy Monthly in Nov &
Dec 5. No. of issues published annually. 76. Annual Subscription Price. \$2497.7.
Complete Maling Address of Known Office of Publication Medatory Media. LLC,
25 Braintree Hill Office Park, Suite 4048. Braintree, MA 02184 Contact: Liz Engel,
Telephone: 61(7) 279-2026. S. Complete Maling Address of Headquarters or General
Business Office of Publisher. Madavor Media. LLC, 25 Braintree Hill Office Park,
Suite 4049. Braintree, MA 021849. Full Names and Complete Maling Address of of
Publisher, Editor and Managing Editor: Publisher, Susan Fitzgerald, 25 Braintree
Hill Office Park, Suite 4049. Braintree, MA 02184. Editor, David Schloss, 25 Braintree
Hill Office Park, Suite 4049. Braintree, MA 02184. Editor, David Schloss, 25 Braintree
Hill Office Park, Suite 4049. Braintree, MA 02184. Editor, David Schloss, 25 Braintree
Hill Office Park, Suite 4049. Braintree, MA 02184. Editor, David Schloss, 25 Braintree
Hill Office Park, Suite 4049. Braintree, MA 02184. Editor, David Schloss, 25 Braintree
Hill Office Park, Suite 4049. Braintree, MA 02184. Editor, David Schloss, 25 Braintree
Hill Office Park, Suite 4049. Braintree, MA 02184. Editor, David Schloss, 25 Braintree
Hill Office Park, Suite 4049. Braintree, MA 021841. Known Bondholders,
Mortagees and Other Sccurity Holders Owning or Holding 1 Percent or More of
Total Amount of Bonds, Mortages or Other Sccurities School. 25 beso nat appl; 31.
Publication Name: DiGITAL PHOTO PRO 14. Issue Date For Circulation Data Belows: SpotOc 2015 15. Extent and Nature of Circulation: A. Total no. copies on the security preceding 12 months: 52064. Actual No.
Copies Single Issue published nearest to filing date: 67. Brain Adverage no. copies each issue during preceding 12 months: 52064.
Average no. copies each issue during preceding

# Looking Forward

#### The Silent Majority

There are more women in photography than ever, and that's a great thing

By David Schloss

#### Beginning with this issue, the "Misinformation" column changes its name to "Looking Forward,"

a shift that we hope will signify our positive and enthusiastic outlook for the future of photography and for the changing trends and practices that shape it. The column will also act as a springboard to the next issue, as we talk about a facet of the world of photography interesting enough to become the theme for our next issue.

I grew up in a darkroom. My father was a commercial photographer, and I spent a lot of time around photographers and camera stores. In those days, everyone had a camera, but most people only took snapshots or pictures at special events. The cost of film and the annoyance of sending it out to get processed limited the appeal of photography, as well as how many people became proficient at taking good pictures.

Perhaps nothing has been more delightful to me than the increased number of people taking pictures in

the digital era. A professional photographer friend of mine groused about the influx of photographers and how it has changed the profession. That's certainly valid, but to me, it's as if the whole world has gotten a super-power. One day every-

one woke up and had the potential to take great photos, but didn't even know it. Certainly, it has made things harder for some working professionals, but it also has raised the standard by which photography is judged. If college students can land jobs at magazines thanks to their astounding Instagram portfo-



Successful wedding photographer Sara France is just one of the many professional women helping to redefine the industry, and we'll profile her in our March/April issue.

lios, surely the world is, to some degree, a better place for photographers.

To me, one of the most important changes in photography has been the demographics of both the professional and amateur markets.

In the days when I wandered camera stores with my father, there was barely a woman in sight because there

ON THE WEB>>

To read our interviews

check out their inspiring

digitalphotopro.com and

go to the Profiles tab.

with leading industry professionals and

photography, visit the DPP website at

were barely any female professional photographers. There outliers, naturally— Dorothea Lange, Diane Arbus, Mary Ellen Mark and Cindy Sherman—but their names are spoken in reverential tones. They're the exception to prove

the rule that photography is a boy's club. Today, though, the world has changed.

Some of the most striking images I've seen of late have come from women photographers, and even as I type this sentence, I wince a bit because to me they're not women photographers, but photographers. And the world is now filled with an incredible array of photographers of all genders, ages, backgrounds and occupations, many of whom are professionals. Fortunately, though, our government tracks a lot of data regarding gender and occupation, so there's a lot of fascinating insight into the percentage of photographers who are women.

The National Endowment for the Arts has surveyed the percentage of women in creative industries for decades. (You can find this information at arts.gov.) According to their data, in 1970, there were 67,588 photographers, and only 15% were women. In 1980, the ranks of professional photographers swelled to 94,762, and 23% were women. By 1990, there were 112,297 photographers, and 31.5% were women, which marked the highwater point for the number of professional photographers in the United States, but not the highest point for the

(Cont'd on page 79)

The moment your creativity is freed of limitations.

#### The new Milvus lenses from ZEISS.



// AMBITION
MADE BY ZEISS

**Unleash the full potential of your creativity,** and your camera, with new Milvus lenses from ZEISS. With Milvus, ZEISS has pushed the idea of what a lens system for ZE and ZF.2 mounts can be to the next level of performance, image quality and design. From portraits and landscapes to architectural and street photography, Milvus lenses deliver smooth and precise focusing in a compact, ergonomic package that's suitable for every shooting situation and light condition. With optimum image quality, intuitive full-focus control and a sleek, modern design, your creativity is now only limited by your imagination.





© CHARLETON CHURCHILL

### **KEEP MOVING**

CHARLETON CHURCHILL AT MT. EVEREST WITH THE PROFOTO B2



In preparing for the Mt. Everest wedding, I absolutely needed the most light and powerful gear, which is why I chose the Profoto B2's.

- Charleton Churchill



